PRODUCTS finishing

Volume 10 DECEMBER, 1945 Number 3

FRED W. VOGEL, *Editor*
(On leave in Armed Forces of U. S.)

ROBERT I. SHORE
Associate Editor

•

Consulting Editors
BRYANT W. POCOCK
H. LEROY BEAVER

Contributors
C. B. F. YOUNG
ALLEN G. GRAY

•

Member
ECA

CONTENTS

Producing License Plates at Norris..... 40
By FRED M. BURT

Heavy Current Applications of Selenium Rectifiers for Tin Plating..... 46
By W. F. BONNER

Organic Chemistry, Part 5..... 54
By DR. C. B. F. YOUNG

Finishing Clinic 76
By DR. ALLEN G. GRAY

What's Ahead in Product Finishes..... 90
By BURR PRICE

Electricity for the Plater, Part V.....100
By D. A. COTTON

News of the Industry.....108

New Equipment and Materials.....116

Opportunity Section 122

The Finishing Touch 124

Catalog Library 126

Index to Advertisements.....128

Published monthly by GARDNER PUBLICATIONS, Inc., 431 Main St., Cincinnati 2, Ohio. MAin 0182

DON G. GARDNER
President and General Manager

JOHN M. KRINGS
Advertising Manager

JESSE R. HARLAN
Manager

G. M. FILLMORE
Eastern Manager
342 Madison Ave., New York (17)
Murray Hill 6-3899

GEORGE H. MEYERS
Western Manager
Tribune Tower, Chicago (11)
Delaware 5441

CHARLES H. DEILY, JR.
District Manager
8134 Germantown Ave.
Philadelphia (18)
Chestnut Hill 2639

RALPH M. FRENCH
District Manager
627 Union Commerce Bldg
Cleveland (14), Main 2866

Printed in U. S. A. Copyright 1945 by Gardner Publications, Inc.

Cowles
TECHNICAL SERVICE on request

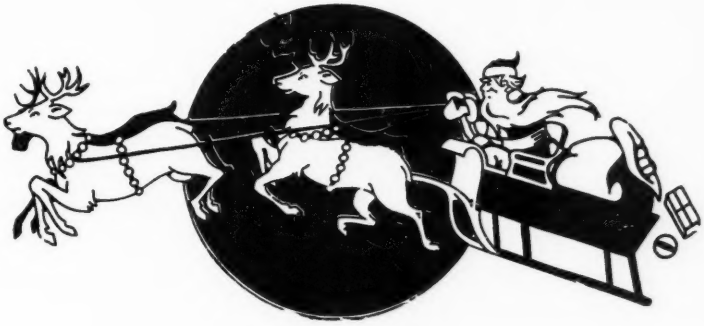
• A new outstanding COWLES CLEANER for non-tarnishing cleaning of polished and unpolished brass, copper and bronze in still tanks with or without electric current—also in all types of washing machine equipment. Cowles K W does not attack the metal. It is fast, efficient and economical. Immediate shipment from warehouse stocks.

THE COWLES DETERGENT CO.

METAL CLEANER DEPT.

7016 EUCLID AVENUE • CLEVELAND 3, OHIO

PRODUCTS finishing



Once again we are approaching the end of another year, a very momentous year which has seen the end of the war in Europe and in the Pacific. At this time, we, of PRODUCTS FINISHING, extend to our many advertisers, readers, and other friends our most sincere thanks for the splendid cooperation and assistance they have given us in the preparation of this magazine.

In the new year ahead, we shall endeavor to uphold, and improve wherever possible, the task of presenting articles and other information of highest caliber and maximum interest to those in the metal-finishing field. With reconversion getting into full swing, the new year ahead should, from all indications, be one of unusual activity for practically all fields, particularly those involving the cleaning, plating, polishing, and finishing of metal products, and, with this thought in mind, we are looking forward eagerly to providing our readers with information that will assist them in the performance of their peacetime jobs.

To everyone then — our advertisers, readers, contributors — we wish a very Merry Christmas and a prosperous and Happy New Year.

Producing LICENSE 1945 Plates at Norris

By FRED M. BURT

THIS article affords an outline of the procedures followed at Norris Stamping and Manufacturing Company, Los Angeles, in the production of 3,500,000 single 1945 California automobile license plates on a continuous and largely automatic basis. The same procedures are also followed in the production of other smaller plates.

The raw stock used in the production of automobile license plates comprises light gauge steel sheets 28 x 31 inches in size. In cutting the sheets down to plate size, the operator, as shown in Fig. 1, uses his left hand to slide each successive sheet off the pile of raw stock and onto the feeding table of the cutting machine. As the sheets are pushed forward, they are engaged by rolls which propell them forward to be slit in two. A counter located on the machine records the number of sheets cut.

The two 14 x 31-inch sheets then travel at right angles to the left onto another table, where "dogs" shove them against four cutters. The resultant five equal size pieces are caught in the containers shown at

Fig. 1 — License plates are cut to size in two automatic operations by means of the machine illustrated.

Fig. 2—Women operators are shown placing license plates on hooks for conveying through dipping and baking machine.

the left of the machine. The camshaft and chain operating mechanisms of the entire machine are synchronized.

The pieces are next lifted out of the five compartments and placed on a platform (extreme left, Fig. 1) which is located directly behind an operator, who picks up the pieces by stacks and feeds them into a machine which automatically trims and punches the pieces at a rate of 5,000 per hour, registering the number on an automatic counter. A worker at the opposite end of the machine receives and stacks the pieces on a lift platform for delivery to a press on which consecutive numbers are stamped or embossed in the plates.

The plates are next placed, in numbered sequence, on the hooks of a 72-foot long x 12-foot wide dipping machine and oven, as shown in Fig. 2. One hundred and ten plates are hung on each of the cross rods which are attached at each end, 20 inches apart, to endless chains. The machine includes 18,000 hooks on which to hang plates, and the total travel time of the hooks through the machine and back through the top in a horizontal plane is 2½ hours. In passing through the machine the plates receive two coats of black synthetic baking enamel so that every five hours 18,000 plates are dipped and subsequently baked and cooled. The travel of the plates at the loading end of the dipping machine is in a downward direction, while just inside the machine the plates are conveyed upward and over another set of sprockets and then down into a deep, 42-inch wide dipping vat containing the enamel.

After being dipped, the plates are conveyed gradually upward and then over a sheet steel draining surface which catches any dripping material that does not immediately flow back into the dip tank. The draining surface is provided with a heavy paper cover which can be easily removed through side access doors, thus eliminating the necessity of cleaning the metal sheet.

After the upward and then vertical travel for a total of about 30 feet, in which time the enamel on the plate sets and commences drying, the endless chain drives drop steeply down and then up and down several times over other sprockets until finally coming down in a vertical plane outside of the oven at the unloading end. This zig-zag travel is mostly through

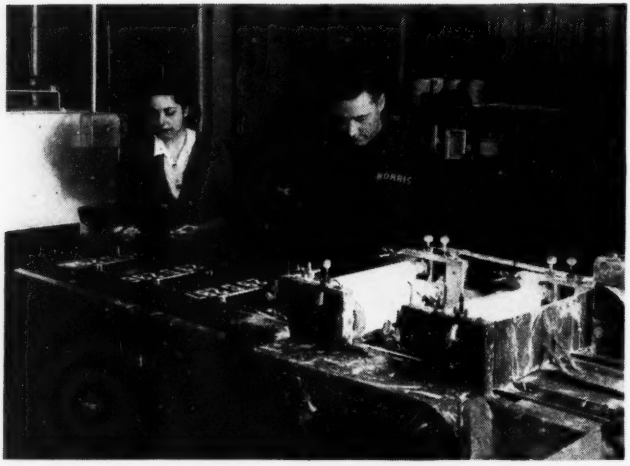


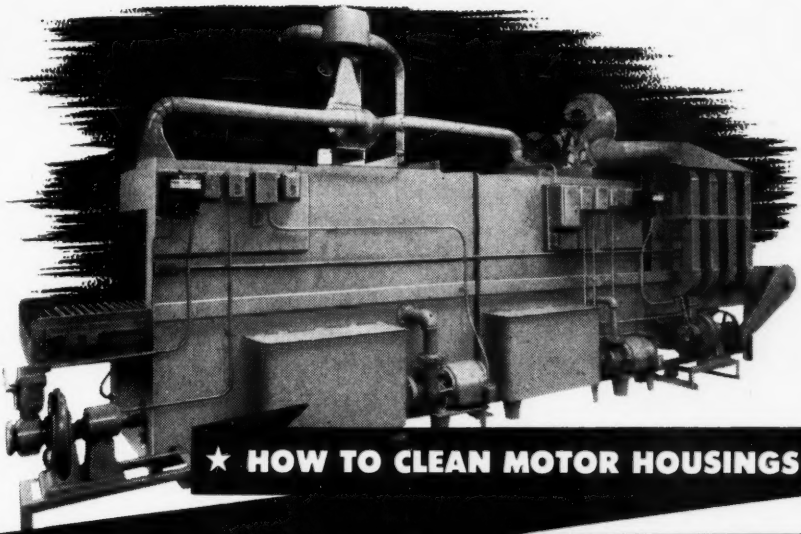
Fig. 3—After coating the license plates with black enamel and drying, numbers are printed on the plates using the equipment shown.

a zone of 250-deg. F. controlled heat which is produced by natural gas burners and distributed by two large blowers. Another blower located at the exit end of the oven provides a cooling circulation. Large ducts extending through the roof carry away moisture and products of combustion.

When the twice-coated plates are removed from the hooks, they are placed on edge on a chain traveling to the right. This fast-moving chain is situated in a V-shaped steel trough and from it little dogs project upward, with spacings slightly greater than the length of each plate. The chain, with its projecting dogs, conveys the plates to the printing mechanism shown in Fig. 3. The inner edge of the trough in which the conveying chain is located can be seen in the lower right-hand corner of the illustration.

The speed of the parallel chains of the printing equipment is synchronized with that of the delivery chain. Guiding fixtures cause the plates to fall flat, raised sides up and bottoms forward, with the properly spaced twin-chain dogs conveying the plates

Fig. 4 — The woman operator shown herein is removing license plates from envelope rack after final baking.



★ HOW TO CLEAN MOTOR HOUSINGS

FASTER, MORE EFFICIENTLY!

THIS A-F wash, rinse and high-pressure air blow-off unit was engineered for the thoro-cleaning of electric motor housings, parts and assemblies. It is also adaptable for cleaning numerous other kinds of castings and machine parts.

The tanks containing the cleaning solution are heated by means of automatically controlled gas burners, which fire into submerged fire tubes.

The parts are carried through the unit on an A-F Flight Bar Conveyor which permits the powerful A-F Super-Spray System to thoroughly wash *all four sides* of the parts at once.

A-F Cleaning and Finishing Engineers can help you solve *your* metal products cleaning and finishing problems. Write today—no obligation.

The ALVEY-FERGUSON COMPANY, 634 Disney St., Cincinnati 9, Ohio

Offices in Principal Cities

***Affiliated Corporation:* THE ALVEY-FERGUSON COMPANY OF CALIFORNIA**

P. O. Box 396, Vernon Branch, Los Angeles 11, Calif.

ARMY (E) NAVY

CONVEYING A-F MACHINERY

Alvey-Ferguson

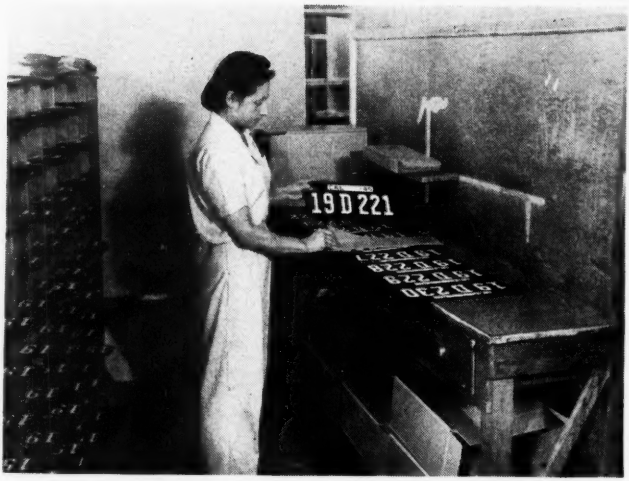


Fig. 5 — The finished license plates are inspected before being placed in numbered envelopes for shipment.

under the printing rolls. At the end of an 8-foot travel, the plates are automatically dropped into close-spaced envelope rack compartments and are conveyed 116 feet by means of parallel chains through the final baking process.

The printing equipment comprises two units, each having three rolls—a large, lower printing roll made of gum rubber, and a lower and upper steel roll. The lower steel roll revolves in a shallow trough containing a dull white enamel. This roll revolves against the upper steel roll, coating it so that it can, in turn, transfer the enamel to the printing roll. When the equipment is used to print license plates 14 inches long, the chains are spaced 10 inches apart and two printing rolls are used. For smaller plates, the chains are adjusted to a desirable, lesser distance of separation and but one printing roll is used.

The oven used in drying the plates after being printed has five overhead outlet ducts extending out through the roof to provide for drying or baking circulation. Heat is produced by gas jets running nearly the full length of the oven and located between the upper and lower lines of travel of the envelope rack containing the plates. The rack has a capacity for maintaining 1,500 plates in the oven at one time. The travel time from entry to exit is 25 minutes, affording a production of 3,600 plates per hour to match that of the previously described oven. Both ovens have variable speed drives.

The finished plates are removed from the envelope rack by one operator, who places them in their proper compartments in the rack shown in Fig. 4. The numbers on the plates to be placed in each compartment are marked on the wooden dividing strips above each container area. When loaded, the rack is wheeled to an inspector, who gives the plates a final check and places them in their prenumbered envelopes, as illustrated in Fig. 5. The plates are then packed into shipping cartons for delivery.

"Check That Rheostat" is the title of a bulletin now being distributed by The Udylite Corp., 1651 E. Grand Blvd., Detroit 11, Mich., illustrating and describing the Udylite Plating Rheostat. Copy is available free to interested individuals upon request.

Announcing

ACID CLEANING AND DESCALING COMPOUND . . .

PENNSALT PM-90

2 VITAL USES

1. As a pickling bath concentrate in metal finishing shops.
2. As an acid cleaner for removing water scales from feed lines, boilers and a variety of industrial equipment.

4 MAJOR ADVANTAGES:

1. **METAL SURFACE PROTECTION:** This carefully manufactured compound is known to give high protection to ferrous metal surfaces. The danger of over-pickling, pitting and high hydrogen absorption will be minimized.
2. **REDUCES ACID CONSUMPTION:** Compared to an uninhibited acid, Pennsalt PM-90 reduces acid consumption since the acid cleaner is consumed principally in the removal of rust and scale and not in attacking the base metal.
3. **IMPROVED WORKING CONDITIONS:** Acid fuming is controlled, thus contributing to better working conditions in the plant.
4. **CONVENIENCE:** Furnished in liquid form . . . can be used either directly from the original container or diluted as much as one part Pennsalt PM-90 to four parts of water. The dilution range will be governed by the speed of cleaning necessary as well as requirements of the particular operation.

PENNSALT PM-90 is packaged in returnable 13 gallon glass carboys containing 115 lb. net. For large consumption, Pennsalt PM-90 is also supplied in tank cars of 4,000 gallons each.

SPECIAL CHEMICALS DIVISION
PENNSYLVANIA SALT MANUFACTURING CO.
Dept. PF-12, 1000 Widener Bldg., Philadelphia 7, Pa.

Kindly send me complete information on Pennsalt PM-90

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

SPECIAL CHEMICALS DIVISION

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals

1000 WIDENER BUILDING, PHILADELPHIA 7, PA.

NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • CINCINNAT
MINNEAPOLIS • WYANDOTTE • TACOMA

SPECIAL CHEMICALS DIVISION PRODUCTS

Acid, Alkali and Solvent-proof Cements · Acid, Alkali and Solvent Emulsion Type Cleaners · Paint Strippers · Pickling Agents · Rust Inhibitor

Heavy Current Applications of *Selenium Rectifiers* for Tin Plating

By W. F. BONNER

SELENIUM rectifiers have been used for the conversion of alternating current to direct current in the United States since their introduction by Federal Telephone and Radio Corporation in 1938. Originally used for the conversion of small power, their field of application now covers in a very satisfactory manner current ranges which, until recently, have been covered only by motor generator sets.

One of the most interesting installations of the Federal Selenium Rectifier is at the Gary, Indiana Sheet and Tin Mill of the Carnegie-Illinois Steel Corporation and at other subsidiaries of the United States Steel Corporation. The low-voltage plating current for some of their modern high speed electrolytic tin plating is supplied by selenium plating rectifiers made by Federal.

Prior to the inauguration of the program by U. S. Steel Corporation to speed up the production of tin plate, the largest single selenium rectifier built was rated at 40 kilowatts. The rectifiers supplying the plating tanks of a line are six in number and each is capable of 540 kilowatts of plating power. Additional direct current is supplied by other rectifiers for electrolytic cleaning of the steel and for recovery of tin from the plating solutions.

Each of the six plating rectifiers supplies 7,500 amperes at 12 volts, and the cleaning and tin recovery rectifiers supply 5,000 and 3,000 amperes respectively, also at 12 volts. All of the rectifiers are of the same general construction and a brief description of the 7,500 ampere equipment will suffice for all.

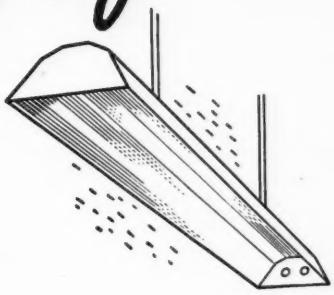
A welded channel frame forms the base for an enclosure for the selenium rectifier and occupies obout two-thirds of the base area. The steel framework at the other end of the base partially encloses the blower and serves as a support for the transformer and controlling reactors.

The rectifier plates are mounted on steel strips which, made up in assemblies of four strips in pairs back to back, form a single half-wave rectifier section. Each assembly is 80 inches long x 20 inches high. Six such half-wave assemblies are mounted side by side on about 2½-inch centers to form a three-phase full-wave rectifier of 1,250-ampere capacity.

The frame holding these assemblies has channel iron longitudinal base members which act as skids. Lifting holes are provided in the

USERS TELL US WE'VE DEVELOPED A

Better Finish for Fluorescent Reflectors



CHARACTERISTICS:

Vedoc Reflector White has unusually hard surface and high reflectance qualities (consistently above 85%) . . . Retains original color and brilliance indefinitely . . . Easily kept clean (is unaffected by grease, dirt and most acids found in factories) . . . Highly resistant to heat, moisture and rust.

APPLICATION:

Only one coat is needed for steel. Finish is sprayed on . . . *not over* two one-thousandths of an inch film is required.

BAKING TIME:

20 minutes at 300° F. or 7 minutes with Infrared. (Optional Schedules are available).

Vedoc Reflector Gray, for channels and backs of reflectors, can be applied and baked at the same operation as the white.

Vedoc

All *Vedoc* finishes are developed for a specific use, then slightly varied to best fit each customer's production setup. For more information about these "better finishes", write . . .

LIQUID PLASTICS DIVISION
FERRO ENAMEL CORPORATION
CLEVELAND 5, OHIO

frame. Each frame slides in place on rollers and electrical connection is quickly made to the a.c. bus at the transformer end of the enclosure and to the d.c. bus within the opposite end of the housing.

The selenium rectifier plates are cooled by forced air provided by the blower referred to above. Baffles within the base distribute the air evenly to all sections of the housing.

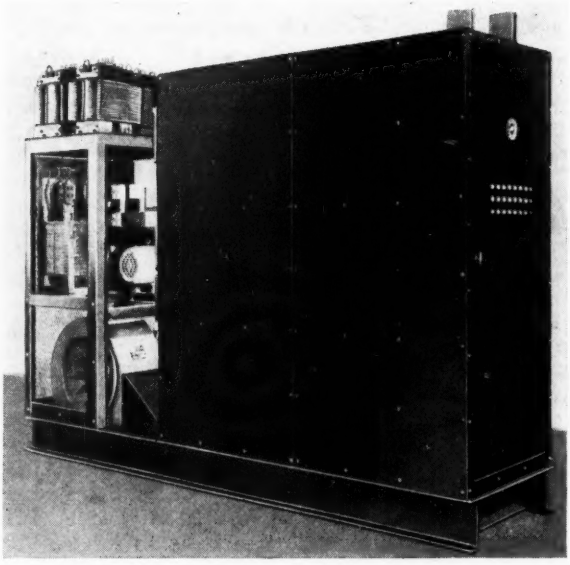
Current to the plating tanks must be capable of control to follow speed changes and to adjust for the width of the strip being plated and the thickness of plating required. This is accomplished through especially designed reactances having both a.c. and d.c. windings. The a.c. winding of a reactor is connected in series with each of three a.c. power leads to the transformer. With no current flowing in the d.c. winding of the reactor, the inductance is high and the voltage across the primary of the transformer is so far reduced as to limit the output voltage to less than 5 per cent of the full low load voltage with a constant resistance load.

When direct current from the control circuit mentioned flows through the d.c. winding of a reactor, the iron core is partially saturated and the inductance proportionately reduced. Reduction of the inductance makes more a.c. voltage available across the transformer and increases the power output of the plating rectifier. Only 0.7 kilowatt of control power is necessary to control the output of a 90-kilowatt plating rectifier.

Operation of the plating line is automatic; precise control of all operations originates in the main control board. The control board is the source of direct current flowing through the reactors and may be preset in accordance with plating requirements and is thereafter responsive to change of speed in the plating line.

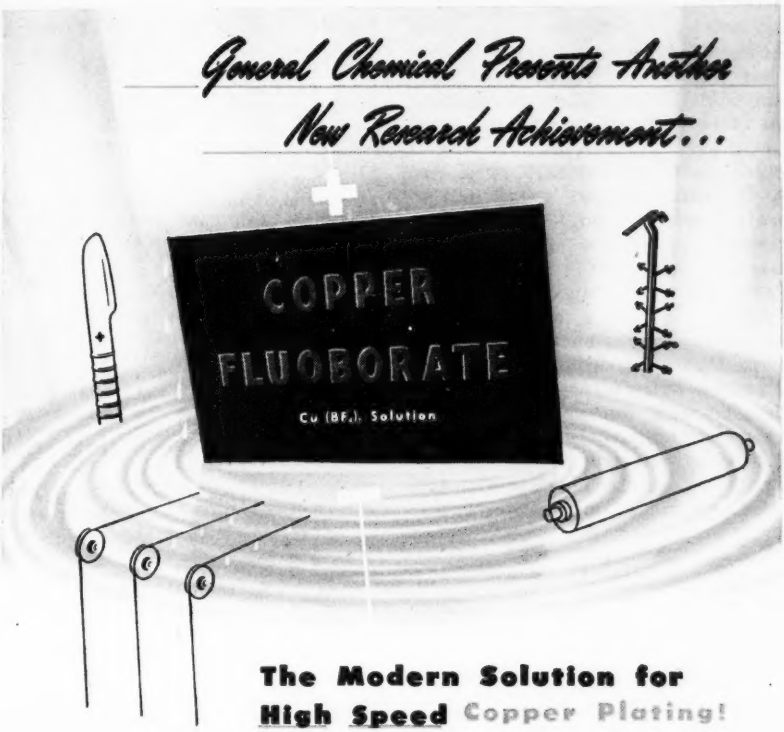
Operation of the plating rectifiers has shown them to have high efficiency and ease of control, both features being important in modern high-speed large-capacity plating installations. The light weight and lack of large rotating parts make a heavy foundation unnecessary. The only maintenance necessary is routine cleaning and lubrication of the blowers and motors.

Experience with the



5,000-ampere 12-volt selenium rectifier plating unit for modern high-speed large-capacity plating installations

General Chemical Presents Another New Research Achievement...



The Modern Solution for High Speed Copper Plating!

General Chemical Fluorine Research leads again with another chemical of progress for the electroplating industry . . . Now, *Copper Fluoborate* . . . a concentrated solution that deposits copper at a higher rate than *any other known acid bath!*

This superior plating chemical also produces semi-bright, fine grained and ductile coatings, as well as plates out heavy deposits when desired. It requires no addition agents and offers unusual simplicity of control.

Total its outstanding advantages. Consider what they can mean to you as an electrotyper, gravure printer, producer of composite copper-nickel coatings, or manufacturer of other copper-clad products that must be plated at fastest rate consistent with quality work. Then—try General's Copper Fluoborate for your plating!

For technical data . . . trial samples . . . or other helpful information on this product, contact General Chemical Company Fluorine Division, 40 Rector Street, New York 6, N. Y. or the nearest General Chemical Sales and Technical Service Office.

GENERAL CHEMICAL COMPANY
40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore • Boston Bridgeport (Conn.) • Buffalo • Charlotte (N. C.) • Chicago • Cleveland Denver • Detroit • Houston • Kansas City • Los Angeles • Minneapolis New York • Philadelphia • Pittsburgh • Providence (R. I.) • San Francisco Seattle • St. Louis • Utica (N. Y.) • Wenatchee • Yakima (Wash.)
In Wisconsin: General Chemical Wisconsin Corp., Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited
Montreal • Toronto • Vancouver

90-kilowatt rectifiers has shown them to be as economical and flexible in operation as smaller units previously made. Multiple operation of rectifiers to increase current output has proved entirely satisfactory, thus making it possible to build rectifiers of a size easy to transport and install and to operate them as a single large source of power by means of a common control.

There is a continued interest in the use of rectifiers in plating and allied fields. Experience has plainly shown that the selenium rectifier has proved satisfactory in supplying high current at low voltage and will have a continuously expanding field not only for electroplating but also in anodizing, electrocleaning and polishing, and metal purification.

Catalytic Chemistry. By Henry W. Lohse. Published by Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. 416 pages. Illustrated. Cloth binding, board covers. Price, $8.50.

Of general interest to the chemist, chemical engineer, and technical worker in all industries, this book aims at a factual presentation of the underlying principles of catalytic phenomena and the application of catalytic reactions in industrial processes. Particular attention has been paid to the presence of impurities in catalytic reaction systems and to the role of traces of other metals in silver, copper, iron, nickel, and so on, used as catalysts.

A separate section has been devoted to each of the various types of catalytic reactions. The nature of properties of catalysts, specific types of catalytic reactions, as well as industrial catalytic reactions have been discussed in detail. Many clear illustrations are provided to aid in the understanding of little understood phenomena.

"Catalytic Chemistry" is divided into five chapters as follows: Brief History of Catalytic Chemistry; Catalytic Theory; Nature and Properties of Catalysts; Specific Types of Catalytic Reactions; and Industrial Catalytic Reactions.

THE BIAS BUFF Moves to New Quarters!

The Bias Buff & Wheel Company, formerly on Communipaw Avenue, Jersey City, has moved to a new location at—

3464-66 HUDSON BOULEVARD, JERSEY CITY 7, N. J.

Here in our well equipped modern plant we shall continue to give our customers the same expert care and attention in supplying them with the well known BIAS Buff and Wheels as heretofore.

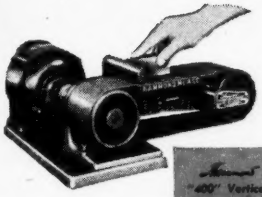
However, during the reconversion period the shortage of material and labor is a definite handicap to our usual prompt handling of orders. This condition, we hope, will soon end, and our regular production schedule will then be maintained to meet every customer's buff requirements.

The BIAS BUFF & WHEEL Co.

Division of Riegel Textile Corp.

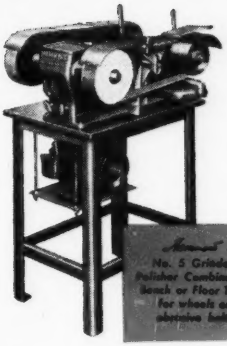
3464-66 HUDSON BOULEVARD • JERSEY CITY 7, N. J.

Telephone JOurnal Square 2-1124



"400" Vertical or Horizontal Bench or Floor Type.

F-2 Flexible-Belt Grinder, Bench or Floor Type.

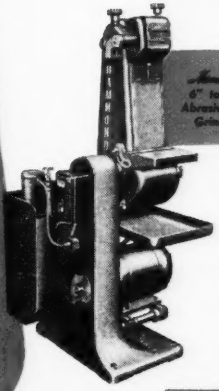


No. 5 Grinder-Polisher Combination Bench or Floor Type for wheels or abrasive belts

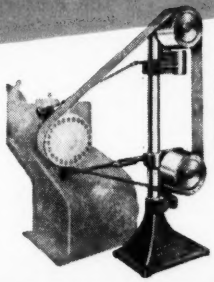
# of KALAMAZOO

ABRASIVE BELT GRINDERS-POLISHERS and BACKSTANDS

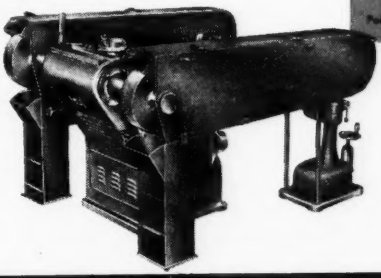
Prominent in the complete line of Hammond Grinding and Polishing Equipment is our Abrasive Belt Line of Grinders, Polishers, Grinder-Polisher Combinations, Flexible-belt and Backstand Units. This relatively new development — the use of abrasive belt machines — has had for its testing-ground the high production demands placed upon it throughout the war years. For faster, better grinding, polishing and deburring round, flat and irregular shaped parts in metal, plastics, wood, ceramics and other materials.



6" to 10" Abrasive Belt Grinders



No. 4 BACKSTAND For use with abrasive belts



No. 3 BACKSTAND and Variable Speed Polisher Unit

Hammond Machinery Builders INC.

1622 DOUGLAS AVENUE • KALAMAZOO 54, MICHIGAN

EASTERN BRANCH: 71 WEST 23rd STREET, NEW YORK 10, NEW YORK

Organic Chemistry

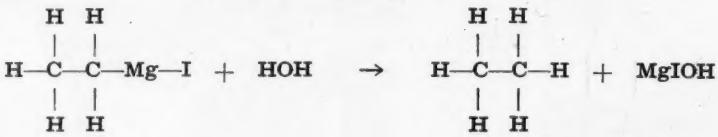
By C. B. F. Young, Ph.D.

Part 5

IF a halogenated compound, for example ethyl iodide, is placed into dry ether which contains magnesium ribbon and the whole heated, a reaction, which is very important, takes place. This is given below:

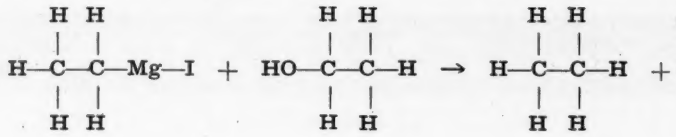
Ethyl iodide — Ethyl magnesium iodide

The product formed is known as a Grignard reagent and must be kept absolutely dry and in an inert atmosphere, otherwise they decompose as will be shown below. This material is important because of its reactivity since it can be used in synthesizing other organic compounds. If the material is allowed to mix with water, the following takes place:



Ethane — Basic magnesium iodide

The following reaction takes place with alcohols:



Keystone Brush

RECOMMENDATIONS ARE BASED ON . . .
TYPE OF EQUIPMENT
And OPERATING CONDITIONS

KEYSTONE Brushes constitute a complete line, with every type and size from fractional horse power to giant generator, and with combinations of materials necessary to meet any given operating condition.

But a brush selected wholly on "type and size" may not solve your problem. Extremely small variations are frequently present in electrical mechanisms identical in design. These variants may arise in manufacture, or be due to service conditions, deterioration, overload, etc. But however small, they may necessitate brushes of equally small differentiating character if maximum efficiency is desired.

To select the right brush is therefore not merely a matter of size and type. It is necessary also to consider the characteristics of the component materials, metal and graphite, and from an infinite number of possible combinations to select ONE that solves the problem—work in which Keystone Engineers are expert.

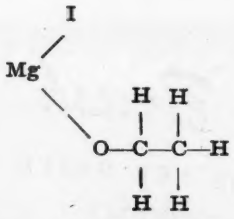
Keystone can meet your brush requirements, whether regular or special, with unsurpassed quality. In the case of special work, describe the trouble to be corrected, give manufacturer's data on your equipment, its wear condition, kind of work on which it is engaged, etc. Keystone Engineers will give you every assistance in finding the right brush.

WRITE FOR LITERATURE ON BRUSHES

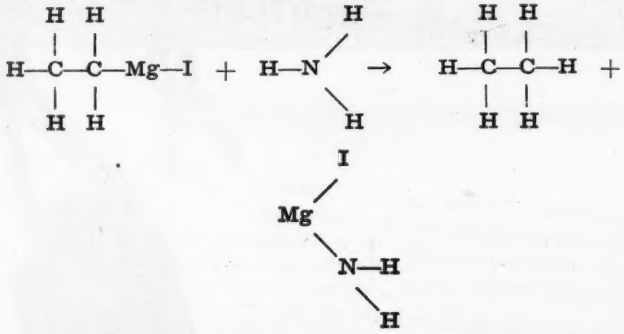
KEYSTONE CARBON COMPANY, INC.

Manufacturers of Precision Molded Products

1935 STATE STREET, SAINT MARY'S, PENNA.

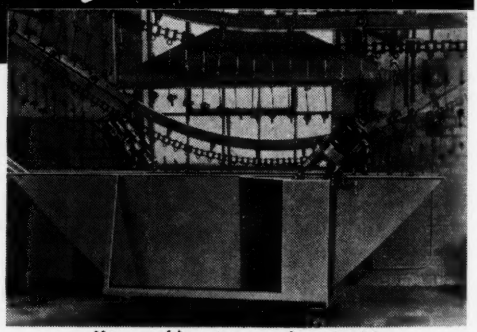


The following takes place with ammonia:



UP GOES EFFICIENCY *thanks to Jensen Engineering*
DOWN GO COSTS

AT Contract Specialties Corp., Detroit, Jensen-built *light weight* conveyors and special-paint dip tanks speed production, save labor on refrigeration dehydraters. Photo shows how unusual arrangement of trolleys on 13" centers with hanging rings every 3¼" (optional) saves conveyor space. Now look at dip tank. See how offsets, to accomodate agitators, banish danger of damaging agitator propeller blades should pieces fall from conveyor.



Your problem, too, can be solved by Jensen. Phone, write or wire today!

JENSEN SPECIALTIES, Inc. JENSEN 9331 FREELAND DETROIT 27, MICH.

DESIGNERS and BUILDERS of "DUAL HEAT" INFRA-RED OVENS • STANDARD and SPECIAL CONVEYORS

Just a little shaver

BUT is his beard tough!

The case is often the same with cleaning metals—a small job may be hard to handle.

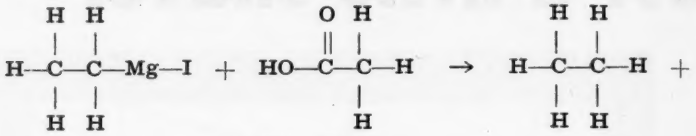
With most jobs it makes no difference, though, whether the work is big or little, simple or involved — if you use Wyandotte Metal Cleaners. There's one of these *specialized* degreasing compounds to fill just about any metal-cleaning need — for cleaning after machining and prior to plating, painting, lacquering, blackening, anodizing, spot welding . . .

And you'll find the Wyandotte Representative fully equipped, too, with the knowledge and experience necessary to help you with your metal-cleaning jobs. Call him today and let him show you the many advantages of Wyandotte Metal Cleaners.

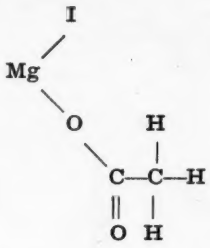
WYANDOTTE CHEMICALS CORPORATION
J. B. FORD DIVISION • Wyandotte, Michigan
Service Representatives in 88 Cities

Wyandotte
REG. U. S. PAT. OFF.

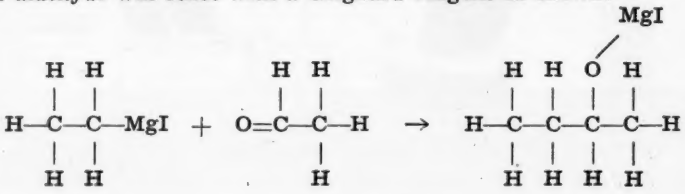
The following is typical of acids and Grignard reagents:



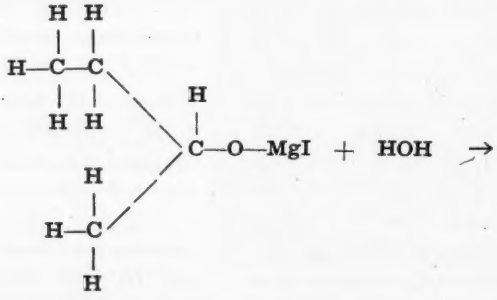
Acetic acid



An aldehyde will react with a Grignard reagent as shown:



If the resulting product is hydrolysed as shown below a secondary alcohol remains:



McAleer GREASELESS

It's Best by Test

For Producing Brushed or Satin Finish, Removing Tool Marks, Flashes and Pitts.

McALEER GREASELESS composition can have an important future in your finishing plans. Unsurpassed for producing satin, Butler or Colonial finishes on base metals or plated parts. Prime favorite for removing tool marks, flashes, pitts and other surface imperfections. And that's not all—when used on a flexible buff, it completely finishes irregular contours and recesses, quickly, easily, cleanly, free of any grease.

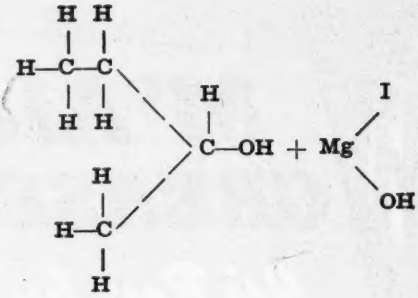
HAVE YOU SENT FOR YOUR COPY?

IT'S FREE!

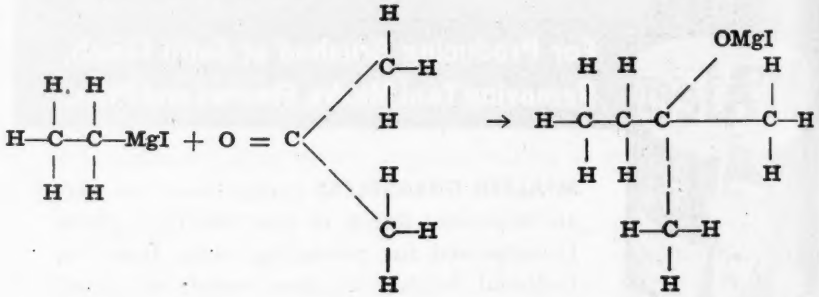
DON'T DELAY
WRITE TODAY

Test McAleer Greaseless —at our expense. State grain size desired. Send for a trial sample today.

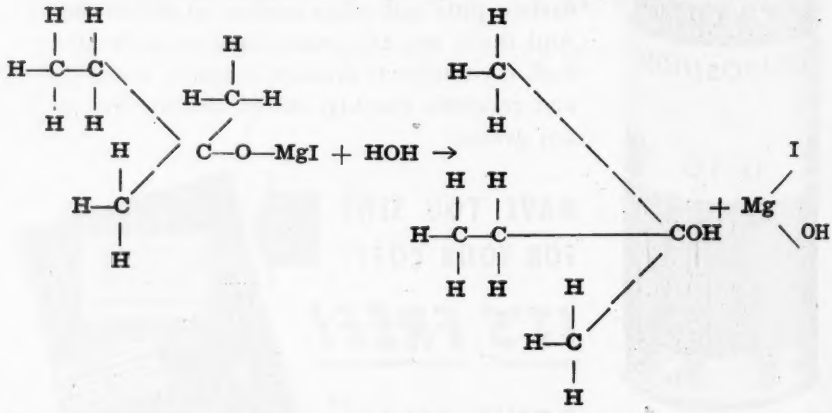
McALEER MANUFACTURING CO. ROCHESTER MICHIGAN



A ketone will react as follows:

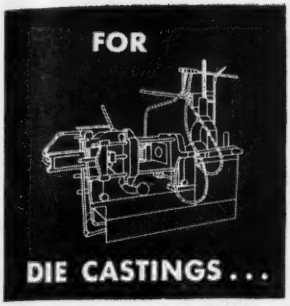


If the resulting compound is hydrolysed, a tertiary alcohol is produced:



The student should note that the carbon chain has been lengthened by this procedure. Thus, a two carbon chain was used as a starting medium and the other carbons were added as desired. This is a very important step in synthetic organic chemistry.

If carbon dioxide is added, an acid is produced. This is shown below:



VAPOR DEGREASING WITH TRICHLORETHYLENE!

This efficient cleaning method speeds production—saves cost!

1. Thoroughly removes grease and oil from metal parts of any size or shape, often in less than one minute.

2. Produces parts clean, warm and dry—ready for inspection, assembly, further fabrication or finishing of any type.

3. Minimizes finishing rejects because solvent reaches and removes grease and oil from deep draws, holes and almost inaccessible places.

4. Reduces risk of damage to delicate parts.

5. Can be used alone or as a part of a process flow line.

6. Utilizes compact equipment.

7. Consumes only small quantities of solvent. Contaminated solvent is reclaimed economically.

8. Uses absolutely pure vapors of a non-flammable solvent as a cleaning medium.

9. Simplifies cleaning procedure, is easy to operate as a process.

10. Saves time and cost in its own operation, and in the subsequent handling and finishing of parts.

HUNDREDS of metal fabricating and finishing operators have cut costs and accelerated production with safe, quick, efficient Vapor Degreasing. Used before and after nearly every fabricating or finishing step, this economical cleaning method yields not only die castings but all metal parts clean, warm and dry—ready for the next operation. Yet to enjoy its benefits, you need only specially designed equipment plus degreasing grades of Trichlorethylene or Perchlorethylene.

SEND TODAY for your copy of our new free book, "Metal Degreasing—Standard Practices." Clip the coupon below.

KEEP ON BUYING BONDS—AND HOLD THEM

E. I. DU PONT DE NEMOURS & CO. (INC.)
Electrochemicals Department
Wilmington 98, Delaware

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

CLIP THIS COUPON

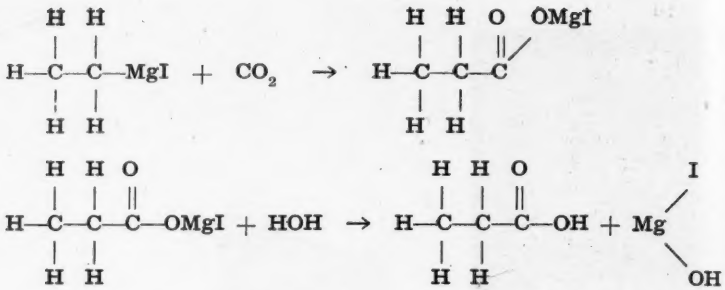
E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department
Wilmington 98, Delaware

Please send me my copy of "METAL DEGREASING—STANDARD PRACTICES."

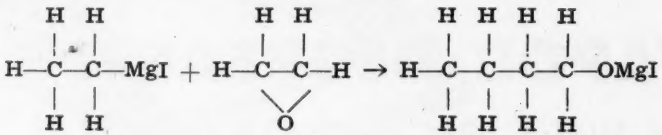
Name_____ Position_____

Firm_____

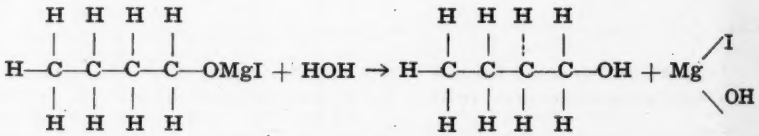
Address_____



Grignard reagents react with ethylene oxide as follows:



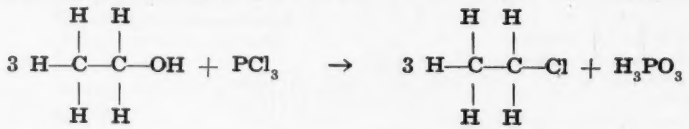
On hydrolysing we get:



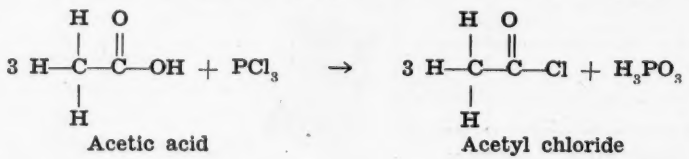
From the above reactions one can see that by the proper choice of the Grignard reagent and the correct carbonyl compound, a variety of alcohols and acids can be made. The alcohols, of course, can be oxidized to the corresponding aldehydes, ketones, or acids.

Acid or Acyl Chlorides

Several times it has been shown that the OH group in alcohols could be replaced with a chlorine atom. Thus:



It is also true that the OH group in an acid can also be displaced. Thus:



Acetic acid — Acetyl chloride

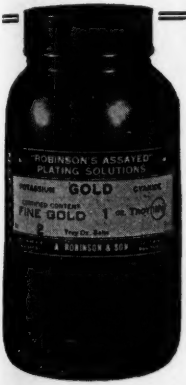
— PLATERS *and* MANUFACTURERS —

SHOULD INVESTIGATE

ROBINSON'S ASSAYED (100%)

GOLD PLATING SOLUTION

Robinson's Assayed Gold Plating Solutions were the first standardized liquid Gold concentrates. They feature gold by weight—not by the quart. Your plating bath can be continuously operated through convenient replenishment. This assures economy and uniform results. Remember your investment in Robinson Gold Plating solutions is always on the basis of TROY ounces (31.103 grams) and the Gold weights are 100%.



ROBINSON'S ASSAYED POTASSIUM

GOLD CYANIDE

IN SALT FORM

Here's another proven product—fully tested in critical war production and now used by scores of shops on equally exacting civilian jobs. You can depend upon ROBINSON'S Assayed Potassium Gold Cyanide successfully to meet your requirements. And, you get guaranteed Gold weight in TROY—100%.

RHODIUM PLATING SOLUTION

(JOHNSON-MATTHEY)

This internationally known and endorsed Rhodium plating solution—Sulphate-Phosphate—is available at pre-war prices. Your needs can be supplied promptly.

Complete information—without obligation write, wire or call.

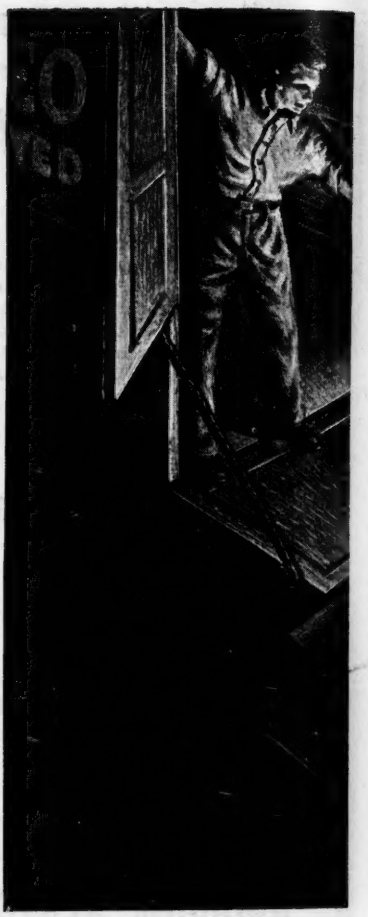
A. ROBINSON & SON

Sixty-Six Years in Precious Metals

131 CANAL STREET **NEW YORK CITY**

Canal 6-0310 — 0464

Clamp a quick strangle-hold on fire . . .



Choking incipient fires in flammable liquids — or in electric equipment — is a simple job for the Kidde Hand Portable Extinguisher. At the pull of a single finger, the Kidde trigger control — now standard on *all* portables from 2 to 20 pounds capacity — sends the fire-fighting force of carbon dioxide gas into action *fast.*

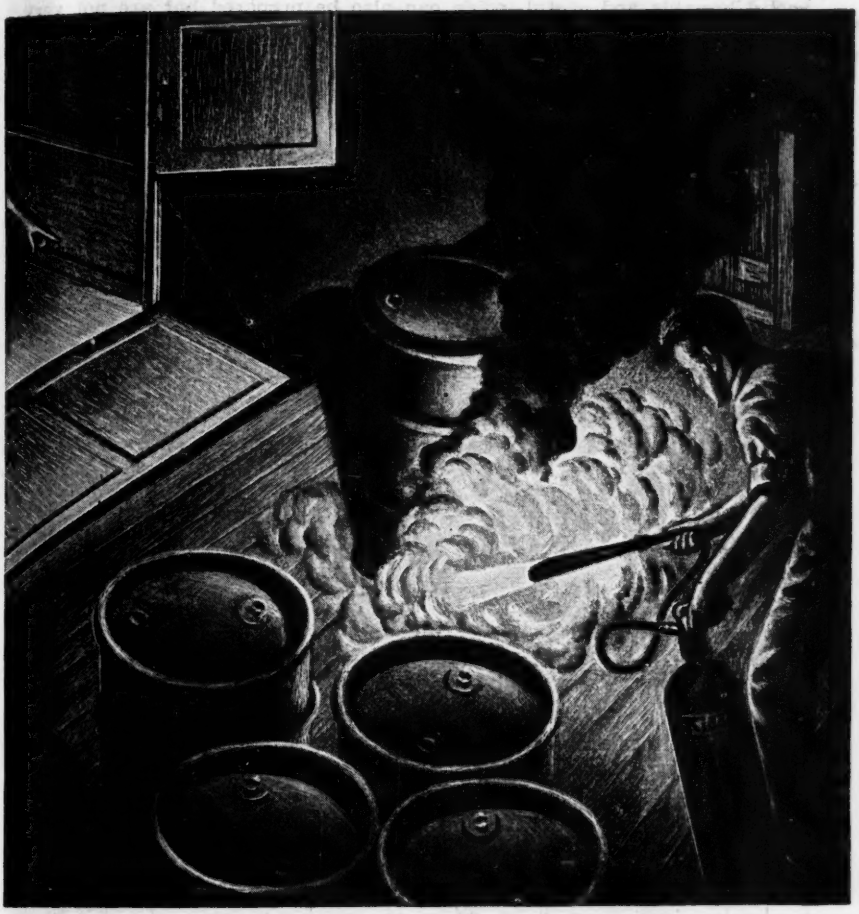
This dry, inert, non-toxic gas quickly smothers the flames. And when its job is done, it leaves no mess or moisture behind. It cannot contaminate or dilute finishes, solvents, or other valuable liquids.

When it's used on electrical fires, there's no danger of electrical energy being carried back through the gas to the operator. No corrosion of equipment, no dissolving or weakening of the insulation.

Walter Kidde & Company, Inc.

Kidde

The word "Kidde" and the Kidde seal are



The Kidde line includes the *right* kind of equipment for protecting every fire hazard in the accompanying list. Ask a Kidde representative for full details.

KIDDE KILLS TOUGH FIRES

in Mixers, Agitators, Solvent Storage, Paint and Lacquer Storage, Spray Booths, Dip Tanks, Drainboards, Control Panels, Switches, Motors and Transformers.

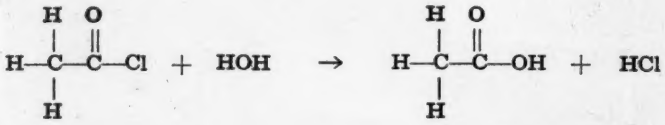
1249 Main Street, Belleville 9, N. J.

trade-marks of Walter Kidde & Company, Inc.

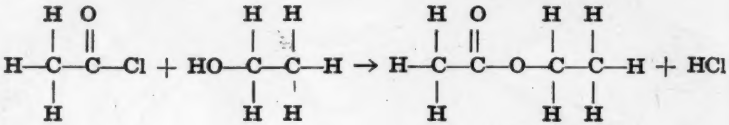
Kidde

Acetyl bromide and acetyl iodide can also be prepared but are not very important.

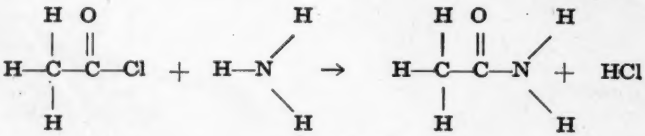
As one would expect, the acid chlorides are very reactive with water as shown below:



The materials will also react with alcohols and ammonia:



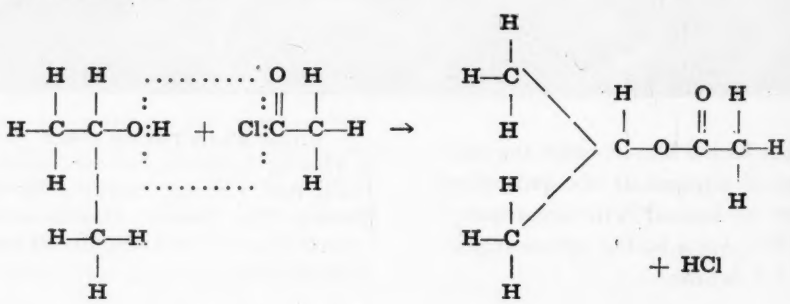
Ethyl acetate



Acetamide

Acetamide is characterisic of the amide group and will be discussed in detail later.

The acid chlorides are very reactive and are used a great deal in synthetic organic chemistry. Many times they are used to detect OH groups in organic compounds. Thus:



It should be pointed out that organic acids are difficult to reduce to the corresponding aldehydes and primary alcohols. However, it is possible to reduce acid chlorides very readily. This is illustrated below with only the results shown. The equations are not complete or balanced.

FOLKS—
THIS MAN IS SPRAYING GLASS

SILCO

IS A NEW GLASS BASE PROTECTIVE SPRAY FINISH

FOR STEEL AND BRASS

Extremely tough. Remarkably beautiful. Soft matte and eggshell gloss finishes in all colors. Ideal for stoves, heaters, mufflers, exhaust and tail pipes, metal filing cases, etc. Withstands heat up to 1000° F. High resistance to corrosion, abrasion, impact.

Easy to work. Spray it on and dry at 200° F. Then bake at 350° F. in any industrial oven. Samples and details on request.

BLACK-MAGIC BLACKING SALTS for STEEL, IRON COPPER, ZINC CADMIUM

•

WITCH-DIP WITCH-OIL FINAL FINISHES

•

SILCO PROTECTIVE COATING

•

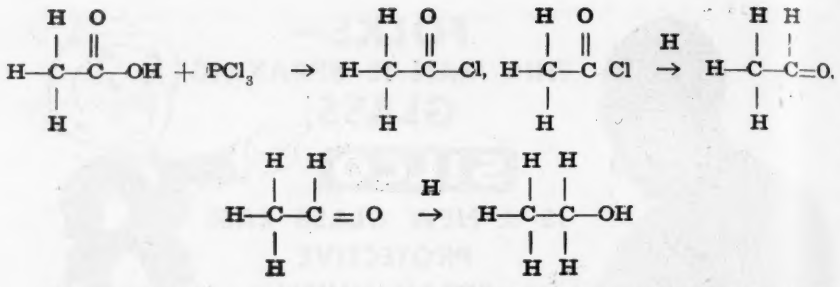
Cleaners Wetting Agents Acid Inhibitors Heat Treating Salts

•

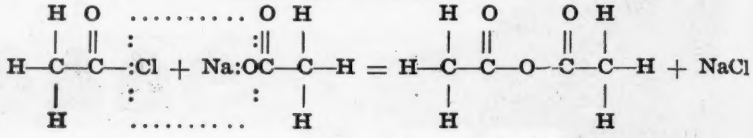
MITCHELL-BRADFORD
CHEMICAL COMPANY
MODERN METAL FINISHES

2446 Main St., Stratford P. O., BRIDGEPORT, CONN.

CHICAGO OFFICE: 111 W. Jackson Blvd. — N. Y. CITY: Lacquer Finishing Co., Delawanna, N. J. — DETROIT: June & Co. — CLEVELAND: Universal Paint & Varnish Co. — ST. LOUIS: G. S. Robins & Co. — INDIANAPOLIS: R. E. Stovall & Associates — PHILADELPHIA: Albert Printz, Germantown — LOS ANGELES: Plastic Coating Co. — OAKLAND: Geo. A. Kushman Co.



It is possible to go from acetic acid to acetaldehyde to ethyl alcohol. Acid chlorides will also unite with salts of fatty acids as shown below.



Acetic anhydride

The compound formed, acetic anhydride, is typical of the anhydrides, which will be discussed later.

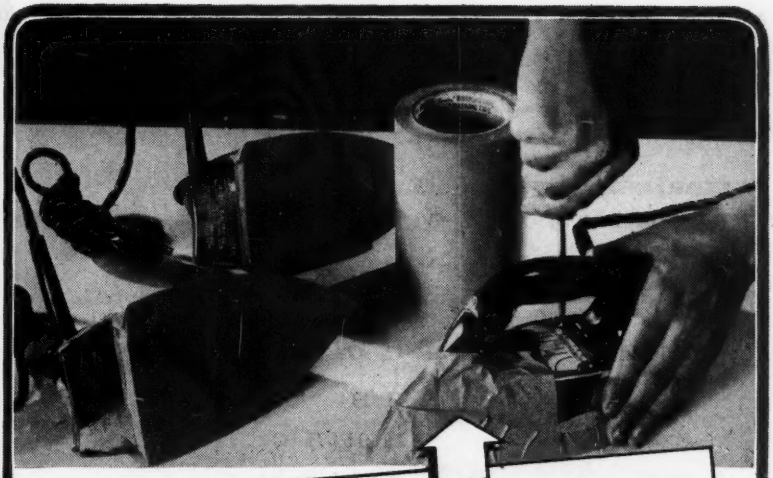
CLEAN and BRIGHT

. . . . Sparkling as a well-scrubbed tot—That's the way your parts come through with a Blakeslee Solvent Vapor Degreaser. No matter how small or large the part to be cleaned, you will find a tremendous saving in production because of the speed and thoroughness of a Blakeslee-built machine. Fifty years of "know how" enables us to answer your most complicated washing and degreasing problems. Write for free booklet.

BLAKESLEE
Solvent Vapor DEGREASERS
Metal Parts WASHERS

STANDARD AND SPECIALS Engineered for you

G. S. BLAKESLEE & CO., CHICAGO 50, ILLINOIS
NEW YORK, N. Y. TORONTO, ONT.



SCOTCH *Masking* TAPE

Reg. U. S. Pat. Off.

PROTECTS HIGH FINISHES DURING ASSEMBLY

● For quick and complete protection of highly finished surfaces during fitting and assembly, "SCOTCH" Masking Tape is a time saver and a money saver.

"SCOTCH" Masking Tape moulds readily to any contour and the pressure sensitive adhesive is equally effective on metal, glass and plastic. It holds tightly as long as desired, then strips off cleanly, leaving not a trace of adhesive clinging to the finished surface.

At a word from you a "SCOTCH" Tape Engineer will be glad to call and place his experience at your service.

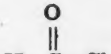
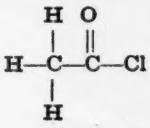
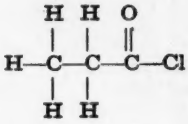
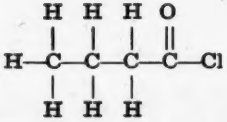
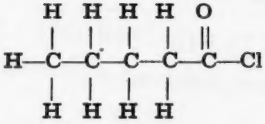
A "SCOTCH" Tape engineer will be glad to help you select the tapes that will do your work best; no obligation.

3-M

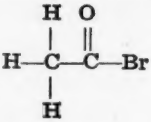
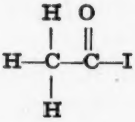
MINNESOTA MINING AND MANUFACTURING CO.

"SCOTCH" is the trade-mark for the adhesive tapes made by M. M. and M. CO.

A list of some acid chlorides with their boiling points are given below:

		B. P. °C
Formyl chloride		Unstable
Acetyl chloride		55°
Propionyl chloride		80°
Butyryl chloride		101°
Valeryl chloride		107°

A bromide and iodide are also given below:

Acetyl bromide		81°
Acetyl iodide		108°

It should be pointed out that these materials are not used "as is" in the

For a real good polishing job use

KEYSTONE EMERY

TURKISH — NAXOS — AMERICAN

KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.

If these are your problems—

1. **Hot Tank Cleaning of Iron and Steel**
2. **Removal of Scale and Corrosion**
3. **Preparing Aluminum for Spot Welding**
4. **Preparing Metal for Plating**
5. **Preparation for Anodizing, Chromitizing, Phosphatizing**
6. **Galvanizing**

Turco has developed many of the finest cleaning materials and methods in the country—for huge industrial plants as well as for one or two-man operation. Check the number you are interested in, and let us send you new and helpful scientific data.

Here is your answer

TURCO

INDUSTRIAL CLEANING COMPOUNDS

TURCO PRODUCTS, INC. *Main Office & Factory:* **6135 S. Central Ave., Los Angeles 1** *Offices & Factories:* **125 W. 46th St., Chicago 9 · 1606 Henderson St., Houston 1, Texas** *New York Office:* **415 Greenwich St., New York 13 · *Offices & Warehouses in All Principal Cities***

Turco Products, Inc., Dept. PF12, 6135 S. Central Ave.
Los Angeles 1, California
Please send us information about
1 2 3 4 5 6 (Check which)

*Name*_____

*Firm*_____

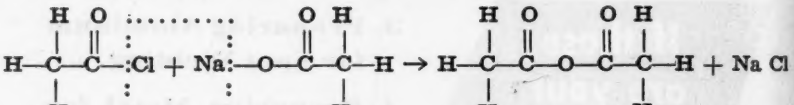
*Address*_____

*City*_____ *Zone*____ *State*_____

industry but are used to produce other compounds. These are typical of "intermediate compounds."

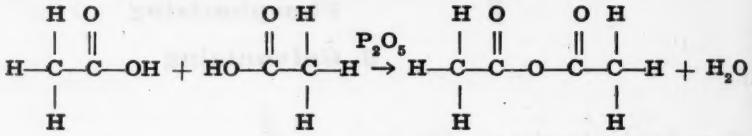
Acid Anhydride

It was pointed out earlier that it was possible to unite an acid chloride with a salt of a fatty acid according to the equation



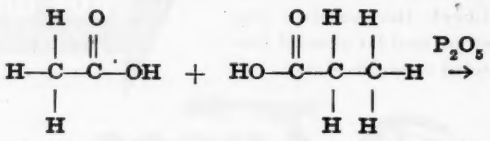
Acetic anhydride

Anhydride means "without water." Thus, if water is taken from two molecules of an acid, the result will be an anhydride. This can be accomplished if acetic acid is heated in the presence of P_2O_5.

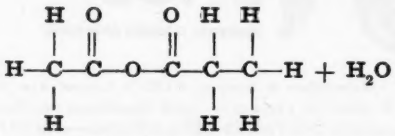


Acetic anhydride

Mixed anhydrides can be prepared by using the proper acids, as for instance:

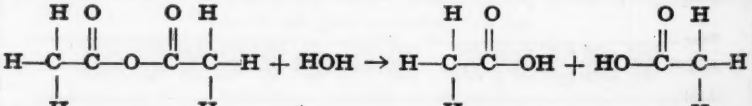


Acetic acid Propionic acid



Acetic propionic anhydride

Acid anhydrides are reactive materials as are the acid chlorides. For this reason they are generally intermediate compounds. They react with water, alcohol, and ammonia as shown below:



Acetic acid Acetic acid

CLEANING-UP A $1,000 RUST-PROBLEM

SUN SPIRITS . . . Cleans Small Parts, Ends Condensation Problems and Resulting Rust-Spots

A New England manufacturer was using a well-known cleaning-fluid for cleaning and drying small parts that had to pass Government inspection. Rapid evaporation caused sudden chilling, resulting in condensation of moisture.

Rust-spots were causing rejects. The management finally switched to Sun Spirits. The rusting-problem was immediately and permanently eliminated, and a total saving of $1,000 a year was the estimated result. Parts now pass inspection easily.

These facts from the files of Sun's industrial products division are typical of the success with which Sun Spirits is being used in hundreds of plants for cleaning metal parts and equipment. For fast, spotless, safe removal of oily films, call the Sun man near you, or write . . .

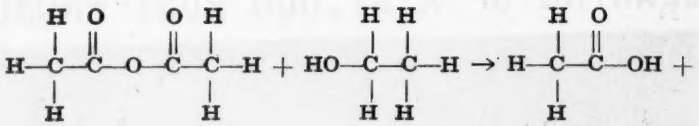
SUN OIL COMPANY · ***Philadelphia 3, Pa.***

Sponsors of the Sunoco News-Voice of the Air — Lowell Thomas

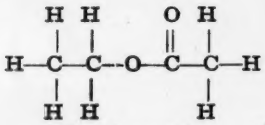
SUNOCO

SUN INDUSTRIAL PRODUCTS

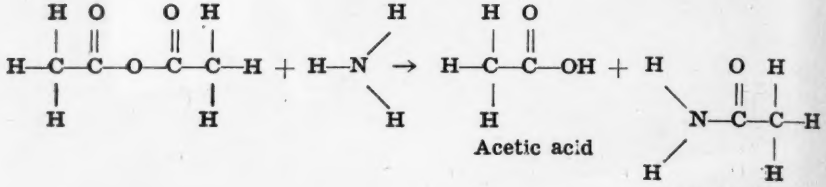
OILS FOR AMERICAN INDUSTRY



Acetic acid



Ethyl acetate

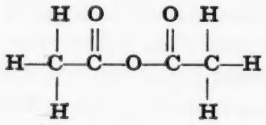
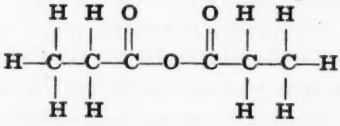
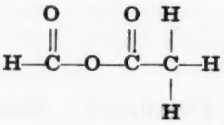


Acetic acid

Acetamide

As fast as the acetic acid is formed and providing there is free ammonia, the two react to give ammonium acetate and water.

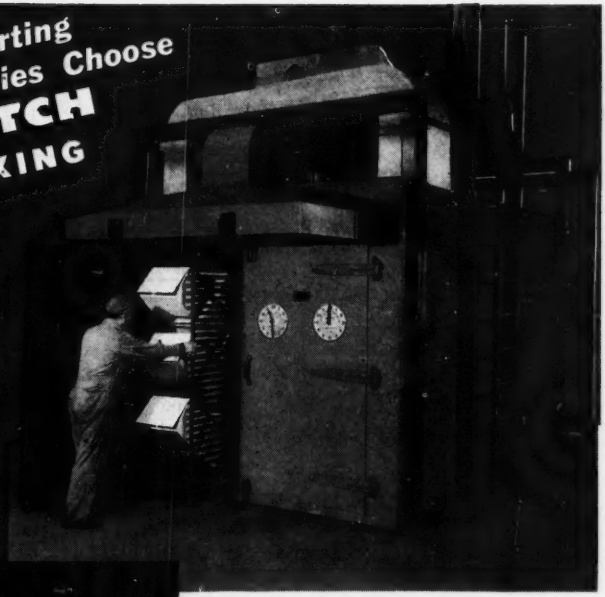
Typical anhydrides can be simple or mixed types. In the first, only one acid is used, such as acetic, propionic, and so on. The second type consists of, for instance, acetic propionic anhydride. In all cases, the two molecules used are different acids. Below is a list of several anhydrides with their boiling points:

		B. P. °C
Acetic anhydride		137
Propionic anhydride		169
Formic acetic anhydride		Decomposes

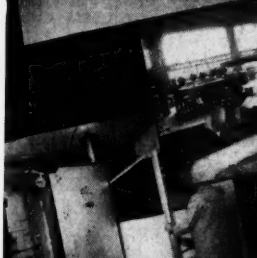
The author would like to thank Mr. W. Jordan Withrow of The City College, New York, for checking the manuscript.

(To be continued.)

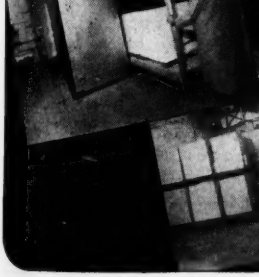
Why Reconverting Metal Industries Choose DESPATCH FINISH BAKING OVENS



SPEEDY DELIVERY



SPEEDY BAKING



FLEXIBLE TO FIT

● Reconverting industries, needing fast deliveries of new equipment, can now take advantage of the speedier production of Despatch Batch Type Ovens.

Two new plant additions, large engineering staff, ample manufacturing and production facilities, plus 43 years of experience—these assure you of *faster* delivery of Despatch ovens.

FAST DELIVERY OF NEW MODELS

These are not prewar ovens; they're 1946 models with many new, exclusive Despatch features developed during the war. This means faster, better baking . . . more flexibility for new finishes and new products . . . lower finishing costs . . . minimum maintenance . . . maximum dependability.

Available in many standard sizes, gas, oil, electric or steam heated. Designed for future addition of conveyors if desired; also special sizes on request.

Write for Bulletin No. 51 or call for an Engineer

DESPATCH OVEN COMPANY MINNEAPOLIS 14 CHICAGO 1

Finishing Clinic

Chromate Films Increase the Corrosion Resistance of Zinc Plated Parts

By DR. ALLEN G. GRAY

•

A Monthly Digest on Current Technical Progress Indicating Significant Trends and Developments in the Finishing Industry

•

THIS MONTH . . . Chromate Films Increase the Corrosion Resistance of Zinc Plated Parts . . . Finishing Improperly Cleaned Metal Is Costly . . . Rust Preventatives for All Types of Service . . . Plastic Coatings Contribute to the Finishing Industry . . . Properties of Anodic Coatings on Aluminum . . . A New Coating Thickness Gage.

PROTECTIVE coatings produced by converting the surface of a metal into a chemical compound of exceedingly low solubility in the environment to which it is to be exposed are becoming of importance and are being increasingly used. It has been generally recognized that the resistance of most metals to corrosion is due to the formation of relatively insoluble corrosion products on the surface by reaction with non-metallic elements of the surroundings. By the choice of proper solutions and conditions, it is possible to produce coatings of this type on almost any metal.

As a result of the extensive use of zinc plating on various steel articles for the war production program, the need became apparent for having practical means of retarding the white corrosion products which form on zinc, especially in salt atmospheres. In the outdoor atmosphere, the exposure of zinc generally produces a thin gray film of corrosion products which has no real influence on the operation of the parts. However, stagnant water with limited access to oxygen, and water films which dry slowly represent a different situation. Under these conditions, a non-uniform type of corrosion may develop which results, in severe cases, in the formation of bulky films of white corrosion products. These films may hinder the operation of devices or otherwise be objectional. In severe cases involving zinc coatings, early rusting of the base metal may occur. The "Cronak" ("Proc. Electroplaters' Soc.," 1943)

film process developed by the New Jersey Zinc Company (U. S. Patent 2,035,380) has been developed specifically to minimize this type of corrosion and has found widespread use on zinc plated parts, many of which have been required to perform vital functions.

In the normal operation of the Cronak process, cleaned work, or work which by virtue of its past history needs no cleaning, is first wet with water, following which it is dipped for approximately 10 seconds in a solution consisting of approximately 200 g./l. (26.6 oz./gal.) of sodium dichromate to which has been added 6-9 c.c./l. (23-34 c.c./gal.) of concentrated sulfuric acid. Following this treatment, the work is removed, drained for not over 30 seconds, and then rinsed thoroughly in cold running water. The water is then removed, preferably by air-blasting.

Careful chemical and physical studies of the Cronak film have lead to the conclusion that it is probably a basic chromium chromate. It is characteristic of the film that it slowly releases its hexavalent chromium to water which comes in contact with it. It is believed that this dissolved material inhibits the subsequent corrosion of the zinc and ensures that accidentally bared zinc areas are protected.

"Anozinc" ("Proc. Electroplaters' Soc.," 1944) is another type of conversion coating which is formed anodically by treating zinc plated articles in a modified chromate bath with the use of electric current. The procedure followed is similar to that used in anodizing aluminum. Properties claimed for the Anozinc coating are hardness and good wear resistance as compared to non-electrolytic coatings. Two types of the coating are available, a yellow and a black. According to reported chemical studies, the yellow coating appears to be largely zinc oxide and zinc chromate with some soluble chromate absorbed from the solution. The black coating is similar except that in addition it also contains basic chromic chromate. Both types of coating retard the corrosion of zinc. The coatings as formed are reported to be non-fragile and can be handled wet or dry immediately after processing or dried using standard methods for plated parts. Of particular interest to production men are the claims that such coatings will withstand flexing, forming and drawing operations satisfactorily and are stable to heat, no tendency toward chipping or peeling being evidenced even near the melting point of zinc.

The "Iridite" dip process ("Proc. Electroplaters' Soc.," 1944) produces an adherent film on zinc plate and belongs to the general class of chromated zinc coatings. It is reported that chemical studies have shown that the major portion of the Iridite type coating is composed of a chrome gel compound, probably lying within the group of chrome hydroxides or hydrated chrome oxides. The essence of the coating appears to be the chromium containing compound or compounds. The process, by forming a continuous integrated surface film of chrome gel, inhibits the tendency of zinc coatings to undergo solution, thereby prolonging the life of the coating.

It is interesting to note that many of the soluble compounds and salts of chromium are able to impart some degree of passivity to metal surfaces. One has only to consider the chromium salts which have been used in a variety of conditions for this purpose, as in pipe and duct systems through which corrosive liquids are pumped. Zinc chromate primers have also found extensive use in paint applications. In general, the chromating processes are methods for treating

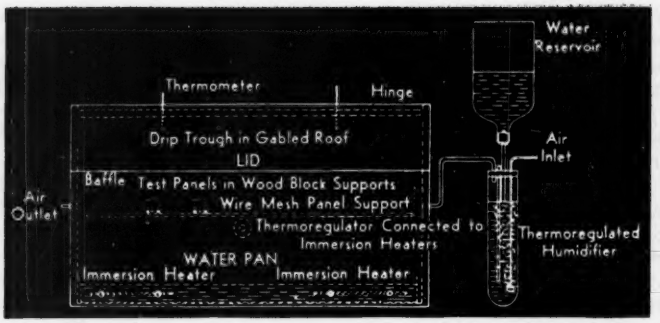


Diagram of the humidity cabinet test for metals

the zinc surface in such a way that it will combine with a chromium salt so that the newly formed chromium compound will be integral with and intimately welded to the metal surface. Some of the factors the metal-finishing production man should consider in chromate coatings are thickness of coating, wear resistance, ductility, and effect of bending operations, as well as corrosion resistance and resistance to condensed moisture.

Some chromate coatings, in addition to the extensive use on zinc electroplates, are being applied to hot-dipped galvanized parts and to zinc die castings. It is reported that extensive tests are now being carried out by a number of paint companies and laboratories on the use of chromate coatings as a surface preparation for both air-dried and baked enamels ("The Iron Age," May 24, 1945).

Metal Cleaners—Finishing Improperly Cleaned Metal Is Costly

To say that a piece of metal is metallurgically clean means that it is free from any materials on the surface which will stimulate corrosion and interfere with application of a finish, thus causing subsequent imperfection or failure of the finish. Experience has shown that attempting to finish improperly cleaned metal is very costly. The above facts were given by A. J. Hereford in a paper on "Practical Information About Cleaning and Cleaners ("Southern Power Power & Industry" 63, 1945).

Among important points of interest to metal-finishing production men stressed by Mr. Hereford was the fact that alkali cleaners should possess free rinsing properities. Strong alkalies penetrate into the pores of the metal and are very difficult to remove. Residual alkalies under paint attract moisture, thereby causing rust and corrosion. Corrosion and rust may swell up four or five times, causing separation and subsequently breaking the paint film. More moisture is attracted and soon considerable paint is undermined. Ingredients in proper cleaning compounds are free rinsing.

Clean rinse water is also essential for free rinsing. It is easy to test for residual alkali with pH paper. Drag-out from cleaner baths may contaminate and saturate rinse baths if they are not continually being refreshened. The efficiency of the rinse is related to the water's ability to absorb soluble matter and to rinse off insolubles. It is sometimes possible to do a good chemical cleaning operation and yet fail to carry off contamination because of dirty rinse water.

Because the cleaning problem on new production always is relatively unknown due to the fact that oils, greases, drawing compounds, and so on, are of variable types and consis-

Protects them from Punishing Plating Cycles

Compounded of new and improved resins, Unichrome Coating 202 has exceptional chemical resistance, unusual toughness and superior adhesion. Even with high-temperature plating solutions, corrosive anodizing baths and severe cleaning cycles, your racks will enjoy a longer, more useful life when insulated with this coating. This means important hours saved and money in your pocket.

Check (right) the properties of Unichrome Coating 202. Order a trial shipment now and put your racks in shape to do a better, longer job for you. Our nearest office will gladly supply information and prices.

*Trade Mark Reg. U.S. Pat. Off.

UNITED CHROMIUM, INCORPORATED
51 East 42nd Street, New York 17, N.Y.
Detroit 7, Mich. • Waterbury 90, Conn. • Chicago 4, Ill. • Dayton 2, Ohio

PROPERTIES

Chemical Resistance—Excellent for all plating cycles.

Toughness—Withstands repeated flexing and shop handling—cuts cleanly and easily at contacts.

Drying—Dipped at room temperature in container in which it is shipped—force dried at 200°F. for extra protection.

Adherence—Excellent for severe cycles. For moderate cycles "Air Dry" coating is recommended.

TRY THESE OTHER UNICHROME COATINGS

Unichrome Air-Dry Rack Coating 203—can be dipped and dried at room temperature, for use in all plating solutions.

Unichrome Quick Dry Stop-Off 322—for cyanide copper and other plating work requiring extreme adhesion.

Unichrome Quick Dry Stop-Off 323—for chromium and other work requiring a stop-off that can be peeled off.

Unichrome Quick Dry Stop-Off 324—for high temperature solutions. It also resists vapor degreasers for a limited time.

tency, the suggestion is made that the production man make pilot plant or laboratory tests to determine proper cleaning compounds and cycles. Elaborate equipment is not required for such tests.

Rust Preventatives—For All Types of Service

AT the present time, a wide range of rustproofing materials is available to the production man ("The Iron Age," June 7, 1945). The war just ended has done much to speed the development of methods for application of rust preventatives to assure protection for every type of service. Cleaning and rust-inhibiting operations are most effective when applied at the proper point in processing. Obviously, the material should be cleaned and rust-proofed in as simple a base unit as possible.

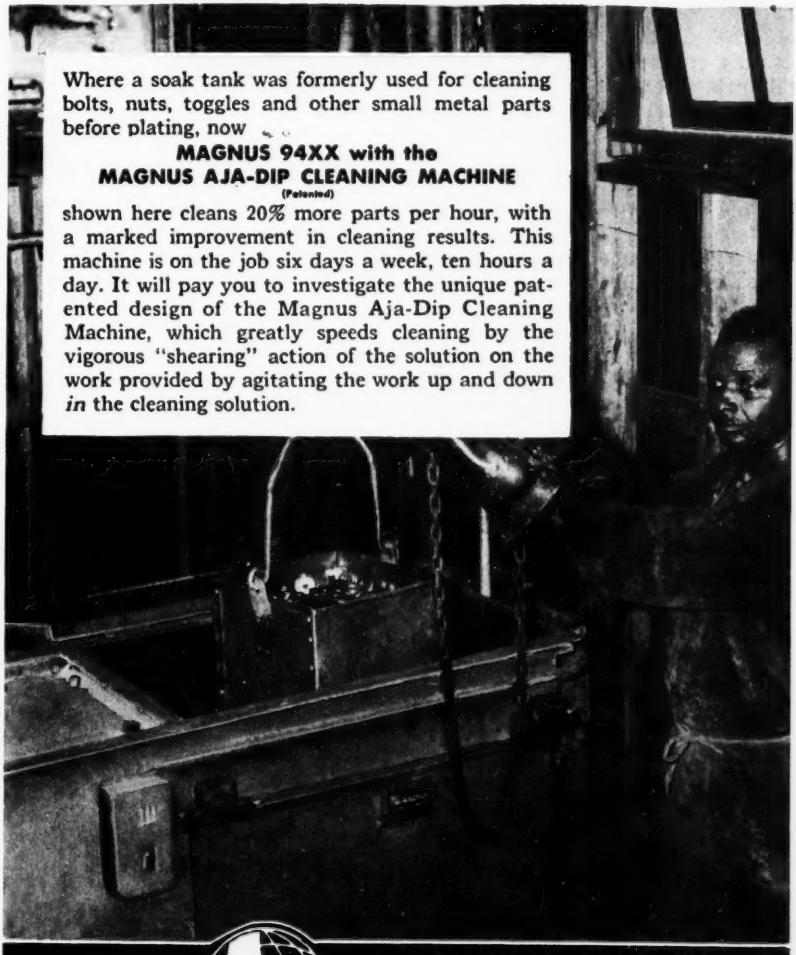
The phrase "rust prevention" is called upon to cover a diverse group of products on the market. Some rust prevention products are used to bring about a state of surface passivation in the metals. Plastics, such as ethyl cellulose, can be made to form a strippable coating or "package" about a piecepart which, by virtue of the fact that it acts as a barrier to moisture and air, is classed as a rust preventative. Waxes have been developed which exhibit adhesion to metals and abrasion resistance properties. Paints, lacquers, and primers are also sometimes classed as rust preventative coatings. One large group of rust preventatives can be included in a single class based on the fact that the products have all been developed from a petroleum base. These preventatives are primarily intended to protect surfaces which must later be free of any coating.

The petroleum-base rust preventatives may be separated according to physical characteristics into (1) preservative oils, (2) solvent cutbacks, and (3) solid or semi-solid rust preventatives. One of the most practical guideposts for the selection of rustproofing materials are the "specs" established by the armed forces. Some manufacturers present their products to the industry according to the service for which they are intended. Where the product is acceptable under government specification, the specification number is usually given. In this system of classification, petroleum-base rust preventatives are segragated for (1) outdoor exposure, (2) indoor exposure, including packaged parts and interior surfaces of machinery, (3) temporary protection, and (4) rust preventative lubricants.

Rust prevention gets off to a good start if the types of rust occurring are correctly identified as to cause. Fundamentally, rusting is a process of more or less rapid oxidation, depending on the severity of the oxidizing influences. The most usual contributing factors have been given as (1) oxidation in the presence of excess humidity, (2) corrosive chemicals in the atmosphere, and (3) stray electric currents. Regardless of the quality of whatever rust preventative material used, poor application or careless handling of the rust-proofed article may result in rusting due to the fact that the rust preventative seal has been broken and oxygen and moisture have been allowed to contact the surface. Moisture and air must be present for most types of rust to develop. Stray currents may result in pitting which may or may not be accompanied by other forms of rust.

Oftentimes in the case of steel, the cause of rust formation can be determined by the design which the rust assumes. Red rust due to oxidation and moisture is generally found on any unprotected steel surfaces

20% Production Boost...
Better Cleaned Parts before Plating



Where a soak tank was formerly used for cleaning bolts, nuts, toggles and other small metal parts before plating, now

MAGNUS 94XX with the
MAGNUS AJA-DIP CLEANING MACHINE
(Patented)

shown here cleans 20% more parts per hour, with a marked improvement in cleaning results. This machine is on the job six days a week, ten hours a day. It will pay you to investigate the unique patented design of the Magnus Aja-Dip Cleaning Machine, which greatly speeds cleaning by the vigorous "shearing" action of the solution on the work provided by agitating the work up and down *in* the cleaning solution.

MAGNUS

MAGNUS CHEMICAL COMPANY
208 SOUTH AVENUE, GARWOOD, N. J.
Cleaners • Machines

which have been exposed to oxidizing influences for any length of time. This type of rust may develop in the storage yard, in the storeroom, or while the material is being shipped. Red rust will occur on any steel surface which has been exposed to moisture without proper drying immediately thereafter.

It may result also from contact of steel parts machined with soluble oils, or on sheet steel where water has been used for cleaning purposes. When the protecting film is inadequate, rust forms on the parts exposed to extremes of temperatures and moisture.

It is necessary that precautions be taken for thorough cleaning of product prior to application of the rust preventative. In order to obtain maximum or even reasonable service from various preservative coatings, there should be no contamination whatsoever remaining on the surface to be coated. As there is no universal method of cleaning applicable to all metals, a cleaning method satisfactory for the surface material must be selected and properly carried out if the coating is to provide satisfactory service life.

The production man is referred to the Armed Service Forces Manual M 406 entitled "Corrosion Prevention Processing and Packaging," obtainable from the United States Government Printing Office, Washington, D. C., for a practical discussion of rust preventative applications.

Plastic Coatings—New Materials, Methods, and Processes

THE development of our plastics industry within the last few years has contributed many new materials, methods, and processes to the protective coating industry. This "plastic influence" is partly responsible for the transition and elevation of the modern protective coating field to an industrial science. Writing in the April issue of "Industrial Finishing," Carl Bauer (Standard Varnish Works) brings out the above facts and emphasizes that the use and application of these chemicals, which were created by research-minded organizations, have brought about new concepts and scientific explanations for many unknown factors encountered in the finishing industry. The introduction of technical terms such as "surface tension," "wetting," "polymerization," and so on, helped to provide the necessary understanding and definition of the basic principles which are related to the adhesion, flow, and drying of a paint film. This technical progress, as pointed out by Mr. Bauer, has enabled the finishing technologist to solve most of the formulating and application problems by correlating

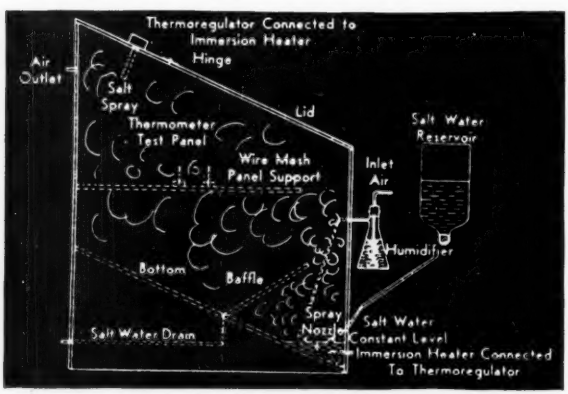
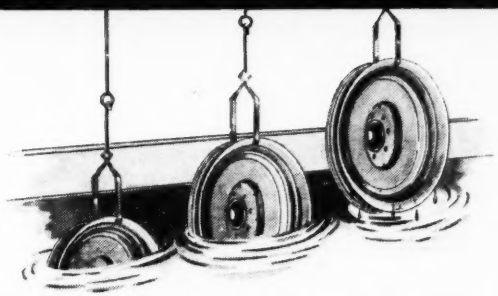


Diagram of the salt spray cabinet test for metals

IRIDITE

PERMITS USE OF ZINC PLATE IN PLACE OF MORE COSTLY MATERIALS



NEW QUICK-DIP PROCESS, ALSO CURBS CORROSION OF GALVANIZING OR CADMIUM

3 WAYS TO BUILD PROFITS WITH IRIDITE

1 ***As a final finish,*** Iridite is available in a variety of attractive colors,

2 ***As a paint base,*** Iridite holds paint or clear lacquer firmly, even on newly galvanized surfaces.

3 ***To reduce costs,*** consider using galvanized, plus Iridite, in place of more expensive metals.

Here's how to use zinc plate in place of more expensive materials. Here's how to curb corrosion on galvanizing, cadmium plate or zinc die-castings. Use Iridite—as a colorful final finish or as a firm paint base!

WIDELY USED

Meeting Army and Navy specifications, Iridite is used on military or civilian products of such manufacturers as Western Electric, Martin Aircraft, Woodstock Typewriters, Sparton, Lockheed and many others. New fields for Iridite are constantly being opened.

SEND FOR TEST PANEL

Send for free test panel, half of it protected by Iridite, and prove for yourself how Iridite balks corrosion . . . how the Iridite treatment does not alter dimensions of finely machined parts . . . how Iridited parts may be cold-worked without flaking, chipping or peeling. Write for free test panel—today! Address: Rheem Research Products, Inc., 14812 Standard Oil Bldg., St. Paul and Franklin Sts., Baltimore 2, Md.

Test Iridite for yourself. Send coupon for this test panel.

RHEEM RESEARCH PRODUCTS, INC.

IRIDITE

Standard Oil Bldg., Baltimore 2, Md.

Reg. U. S. Pat. Off.

RHEEM RESEARCH PRODUCTS, INC.
14812 Standard Oil Building
Baltimore 2, Maryland
Gentlemen: Please send me a free panel of Iridite-treated zinc plate for laboratory testing and full information and operating details.

Name.....

Company.....

Address.....

the known fundamentals of chemistry, physical chemistry, and chemical engineering.

The term "plastic" came to be used in the coating industry with the introduction of high polymer synthetic resins, especially with the appearance of the vinyl resins in 1935. The use of plastics for finishing materials, however, originated a long time before this as a result of the introduction and expansion of nitrocellulose as a basic ingredient of protective coatings. Nitro-cellulose proved to be a versatile raw material that combined many attractive features besides its drying speed, which made it an ideal finish for the automotive industry where it facilitated the adoption of mass production. Within a short period, the use of lacquer finishes expanded to nearly every industry and covered all types of surfaces. The commercial importance of cellulose acetate, ethyl cellulose, and the mixed esters of cellulose are proof of the wide range of possibilities of organic synthetic chemicals. Most of these compounds are, of course, modified for increased utility, regardless of their use as a plastic. These different cellulosic materials make it possible to produce a variety of thermoplastic surface coatings with unusual properties—coatings that add beauty and utility to finished products.

The vinyl resins, which are divided into several different chemical types, are among the newer thermoplastic synthetics. They possess extreme chemical inertness, acid and alkail resistance, and produce tough and highly resistant films. As a result of war accelerated plastic research, a number of new materials can be expected which possess a remarkable combination of unusual properties, such as extreme water and heat resistance, inherent fungi resistance, toughness, acid and alkali resistance, and low temperature flexibility.

The thermosetting type of plastic also has found wide usefulness as a protective coating. Phenol-formaldehyde resin baking solutions are now applied to produce insoluble, corrosion-resistant, and chemical-resistant finishes for many types of industrial equipment.

The development of alkyd resins provided the industry with a new basic raw material for air-drying and baking coatings that afford excellent adhesion, hardness, gloss, and weather resistance. Alkyd modified urea and melamine formaldehyde resins were used on refrigerators and washing machines to produce fast-curing, high-heat thermosetting enamels. On application, they resulted in a non-yellowing, porcelain-like, marproof film which possessed good heat stability, oil and gasoline resistance, as well as high resistance to humidity and moisture. Our synthetic rubber program opens up the possibility of future use of high-polymer synthetic elastomers for extremely flexible and solvent-resistant coatings.

The progress made in the plastic and coating industry has also reflected itself in improved methods of application of protective finishes. Developments resulting in hot dipping, hot spraying, flame spraying, infrared baking, and muffle furnace curing show a definite trend toward lower application costs and a fast one-coat finishing schedule, similar to plastic molding. The appearance of new plastics and the discovery of new facts about the older ones makes it imperative for the finishing technoligist and production man to keep up to date on the subject.

Properties of Anodic Coatings On Aluminum

ALUMINUM is anodized for the purpose of increasing its resist-

In the rush to produce civilian goods, make haste safely and confidently with a Pratt & Lambert paint, varnish or lacquer.

PRATT & LAMBERT-INC.
Industrial Finishes
NEW YORK BUFFALO CHICAGO
FORT ERIE, ONT.

ance to corrosion and abrasion, to provide a receptive medium for coloring, painting, and dyeing, and to obtain an electrically insulating surface ("Proc. Electroplaters' Soc.," 1944). During the war, these anodic coating were used extensively to protect aircraft and military material against unusual and severe service conditions. In the future, they promise to make aluminum more useful by providing hard, wear-resistant surfaces which are readily cleaned, help protect against corrosive attack, present an attractive appearance, and may be given an endless variety of color for many applications.

Aluminum itself occupies a position high in the electromotive series of metals. It must be considered as an exceedingly active metal. However, its chemical activity is sharply reduced by the surface formation, spontaneously, in air of a thin, self-healing film of aluminum oxide. The original experiments in anodizing were carried out for the express purpose of improving and enhancing the characteristics of this naturally occurring oxide film and making it thicker. Commercially, anodic coatings are made by electrolytic oxidation in solutions such as chromic, sulfuric, or oxalic acid.

The anodizing process can be considered the opposite of plating. The work is the anode and highly reactive oxygen is liberated at the anode and reacts with the aluminum to form the oxide film. After the first film of oxide is formed, oxygen must penetrate in order to react with a fresh aluminum surface. Due to this fact, it will usually be noted that the voltage required will increase gradually as the film is forming. The exact thickness of the oxide film formation depends largely on the condtions of the electrolysis.

Oxide films produced by the electrolysis of chromic acid solutions are relatively thin and range in thickness from 0.0000012 to 0.00008 inch with about 0.00002 inch of film being of commercial importance. Aluminum anodized in sulfuric acid solutions produces a film that is somewhat harder and lighter in color than films produced in chromic acid, closely adherent, and relatively thick. Films range from 0.0001 to 0.001 inch with a thickness of about 0.0004 inch obtained in the normal commercial cycle. Oxalic acid coatings have a grayish cast, afford excellent protection, and are of the same order of thickness as those formed in chromic acid. Sulfuric acid types of anodic coatings are always considerably thicker than either chromic or oxalic acid coatings and are much more suited to dyeing. All three methods of anodizing are in commercial use, with oxalic acid procedures finding their principal application in the formation of coatings for the electrodeposition of other metals on aluminum.

To improve resistance to corrosion and abrasion, sulfuric acid coatings which are not to be dyed are sometimes sealed in boiling water for about 20 minutes or in a hot 5 per cent solution of sodium dichromate, where a yellow color is not objectional and where additional resistance is desired. In this manner, the porosity of the oxide is markedly reduced and the surface is effectively sealed against further inclusions. For this reason, hot water rinses prior to dyeing should be avoided for best results. Cold water with agitation of the work is entirely sufficient.

A New Coating Thickness Gage—Magnetic Principle, Non-Destructive

LOCAL thickness measurement of coatings on steel by magnetic means is generally considered to be ideal because of its rapidity and nondestructive nature. A new coating thickness gage, which employs the

The Plating Industry's Big 4

MICCROLOID

The most effective Industrial Corrosive-Resistant yet developed. For use on all plating equipment, structural steel, walls, floors, pipe lines, air ducts, etc. Compounded from thermo-plastic resins. Can be brushed, dipped or sprayed. Equally effective on metal, concrete and wood.

MICCROLAC

A mirror-finish, water-white lacquer coating that protects and beautifies the finest of plated and decorative metal finishes . . . Can be sprayed, dipped or brushed . . . Dries very fast —is unequalled for adhesion, extreme flexibility and abrasion resistance.

MICCROTUBE

An extruded plastic base protective tubing—especially suited for use on straight or bent contact wires. Also on selective plating of simple parts. Usually used in conjunction with Miccrotape—fused together to form a perfect leakproof coating.

MICCROTAPE

An extruded tape for masking parts prior to selective plating. Offers unexcelled protection for plating racks. Unaffected by boiling cleaning solutions. The tapered edge permits smoother overlapping and fitting into corners.

and NOW . . . .

COMING!

A new MICCRO protective coating destined to revolutionize the plating industry. Announcement soon! Look for it.

MICCRO Products

MANUFACTURED AND DEVELOPED BY EXPERIENCED PLATERS

MICHIGAN CHROME and CHEMICAL COMPANY

6340 East Jefferson Avenue • Detroit 7, Michigan

electromagnetic principle for determining the thickness of non-magnetic coatings on steel, has been described in the August issue of A.S.T.M. Bulletin by S. Lipson, metallurigist Frankford Arsenal, Philadelphia, Pennsylvania.

The principle of operation may be summarized as follows:

As a soft iron core is withdrawn from the field on an energized alternating current solenoid, the magnetic pull upon the core increases. If the solenoid is held in a vertical position over a coated steel article and lowered sufficiently to permit the lower end of the core to contact the surface, the distance which it must be raised for the pull of the solenoid to overcome the attraction of the core for the ferromagnetic base metal will vary inversely with the thickness of the coating.

The reproducibility of the instrument was found to range from ±5 per cent for films 0.002 inch thick to ±3 per cent for coatings exceeding 0.002 inch. Voltage variations occurring within reasonable limits had no significant effect on the accuracy of the determinations. The instrument was found to measure coating thickness up to 0.008 inch and is also characterized by the following properties: (1) simplicity, (2) small size, (3) low cost, and (4) rapid measurement. The production man dealing with routine thickness measurements may wish to investigate this new technique.

"Salt of the Earth." The Pennsylvania Salt Manufacturing Co., 1000 Widener Bldg., Philadelphia 7, Pa., has published an attractive booklet entitled "Salt of the Earth" which describes this firm's mechanical exhibit at the Franklin Institute in Philadelphia. This exhibit presents a simulated working model of a chlorine-alkali plant in actual operation. The center spread in the booklet is a photographic reproduction of the exhibit as it appears in the Institute. Sections of the model appear on the pages to help clarify the descriptions of the various processes.

A three dimensional model of the chlorine atom is part of the Pennsylvania Salt Manufacturing Company's exhibit. The booklet shows some of the current conceptions of the chlorine atom and origin of the chemical and physical properties peculiar to this element. Copy free upon request.

ATTACHED to a standard rivet sorter, the electronic device illustrated herewith, developed by Walter H. Bankard of The Glenn L. Martin Co., Baltimore, Md., has been the means of improving the methods of anodizing rivets so as to increase output and reduce man-hours.

The development is a special electronic device of low voltage with a mechanically operated lever which is energized by completing an electrical circuit between the plate and the contact point. As the rivets pass through the separator, the contact point touches the head of the rivet and, if the rivet does not come up to anodic specifications, a small relay is energized, and the relay ejects the rivet.

TWO MODERN BLACK FINISHES

PENTRATE

(Rust Resistant) (Phytanium Blended)

The only patented 2-BATH Process

(Patent No. 2,192,280)

BLACK

FOR

STEEL

PX

BLACK

FOR

STAINLESS STEEL
CAST IRON
MALLEABLE IRON

The war department specified PENTRATE and PX for blackening of many weapons and other important war materiel during World War II. In accordance with these orders, hundreds of PENTRATE and PX units operated in army ordnance camps throughout the U. S. and overseas. Here PENTRATE and PX proved their supremacy.

War-proven applications of PENTRATE and PX point the way to hundreds of new peace-time uses.

• • •

Write for a *Free* Catalog

or

Send Sample Parts for *Free* Treatment

HEATBATH CORPORATION

SPRINGFIELD 1, MASSACHUSETTS

IN CANADA — William J. Michaud Co., Ltd., Montreal

What's Ahead in Product Finishes

By BURR PRICE

REVIEWS of past progress in the field of specialized product finishes and predictions of far greater developments in the years immediately ahead were contained in the proceedings of the "Convention-at-Home" of the National Paint, Varnish and Lacquer Association distributed by mail to member manufacturers and raw material suppliers early last month. Forward strides already achieved in protective coatings technology are attributed to chemical advances through scientific research, and prophecies of continued and greater progress are based on a conviction of the industry leaders that some portion of gross income must be sacrificed to a sustained program of research.

Service to customers through formulation and production of quality materials was also a note stressed by the industry leaders, who recognize a need for the protection of their established business and the creation of new business for the buyers of their finishes. The report of Paul S. Kennedy, chairman of the Specialized Production Finishes Committee of the association, put emphasis on the new era in these words: "There is general recognition of the change which has progressively taken place with many of our product finish customers. More and more, we deal with laboratory men and engineers who are interested in facts and figures."

Mr. Kennedy cited an example of good effect of "quality and service approach" in customer relationship by saying: "Our industry enjoys a splendid lacquer business today. But only because of the lacquer license which compelled competition on a quality basis. Apparently doomed, because of a progressive trend toward lower and lower quality, manufacturers were encouraged to produce lacquers which really serve the purposes for which they were intended.

"It would be difficult to find another example in industry which made suppliers and consumers alike so generally happy and satisfied. Surely there can be little question of the desirability of sound business policies, which made for constant striving to give our customers better products and afforded our laboratories the incentive and the lattitude to do it. Let us continue to compete in upgrading our products, in producing better and better quality rather than to strive merely to produce cheaper goods that cannot serve our customers or the public which in turn is served by them."

NEW CATALOG OFFERS AIDS TO LOWER COSTS

Use It To Select Power Equipment For Your Plating Or Anodizing Shop

Here is a catalog written by engineers—for engineers—yet it has data, tables and illustrations so complete that all engaged in the electroplating or anodizing industries will find it useful.

It tells a comprehensive story about G-E Copper-oxide rectifiers and controls—their characteristics, construction, applications.

A feature of the catalog is a section which explains how G-E automatic power equipment will accurately maintain constant tank voltage from *no load* to *full load* and provide smooth *on load* steady adjustment of d-c power over the equipment's entire output voltage range.

If you're interested in taking advantage of the efficiency, flexibility and low operating costs which modern G-E plating and anodizing equipment offer, send for a copy of this new catalog.

JUST CLIP AND MAIL THIS COUPON

General Electric Company
Section A1251-70, Appliance and Merchandise Dept.
Bridgeport, Conn.

Gentlemen:

Please send me a free copy of your new catalog, publication number 52-52.

Name.....

Address.....

City.....State.....

GENERAL ELECTRIC

Rapid Product Finishes

Infra-red baking and induction heating were considered in a paper on "Rapid Product Finishes," prepared by Paul O. Blackmore, director of products engineering and development for the Ault and Wiborg Division of Interchemical Corporation and newly-elected president of the Federation of Paint and Varnish Production Clubs of the United States. He briefly traced the struggle of protective coatings technicians to achieve faster and faster drying, from the day in 1855 when J. S. Stass discovered lead, cobalt and manganese driers (which reduced drying time from weeks to days) to the present era when one of his customers cured an enamel finish on lightweight steel in nine seconds. A speed bake finish plus heat induction had turned the trick.

"From now on," said Mr. Blackmore, "there is little room left for progress in industrial finishing insofar as speed is concerned, and all efforts must be devoted to improvement in durability, ease of application, higher solids and other desirable physical properties." He continued: "This new-found speed in product finishing was made possible by the harnessing of the chemical process of polymerization. Polymerization is defined as the union of simple molecules of a substance with each other to form more complex molecules. Whereas oxidation is accelerated by the addition of metallic driers or 'catalysts,' polymerization is accelerated by the application of heat. All of the reacting materials are present in the film as it is applied. It is unnecessary to provide an adequate supply of oxygen or anything else except heat. The speed of reaction is proportional to the speed at which heat is applied.

"Polymerization is not new. It takes place to a certain extent whenever any kind of a film is baked. It will also occur in some types of films at room temperature with the aid of certain catalysts. Other industries have used polymerization for many years. The rubber chemist calls it vulcanization. However, it was not until the advent of solvent soluble urea and melamine resins that polymerization was utilized in its fastest form in the protective coatings industry.

"Used in proper combinations with certain alkyd resins to provide gloss, adhesion and flexibility, the urea and melamine resins produce finishes which have brilliant initial color and color retention both in sunlight and heat, excellent durability and many other desirable properties. These speed-bake finishes were just getting off to a flying start when the war created a shortage of materials with which to make them. It is predicted that they will start in where they left off and proceed to capture a substantial share of the industrial finishes market."

In closing his discussion of rapid product finishes, Mr. Blackmore mentioned some of the innovations in drying equipment that helped to make the speed-bake schedules possible.

Infra-Red Drying

"Just about the time speed-bake finishes came into being," he said, "infra-red drying also appeared on the scene. It was a natural to couple speed in molecule building with speed in heat transfer. Both the convection and conduction methods of heat transfer are relatively slow. Radiant heat transfer is extremely fast. Furthermore, the film itself tends to act as an insulator and retards the rate of heat pickup by the metallic body when that heat is brought to it by circulating hot air. Infra-red rays, however, have the ability to penetrate the film and get directly to the sur-

HORN *suggests—*

KERATYN

NEW · LOW BAKE · QUICK BAKE

PORCELAIN LIKE FINISH
NO DISCOLORATION
CLEAR AND IN ANY COLOR
ANY DEGREE OF GLOSS

A. C. HORN COMPANY
PRODUCTS FINISHING DIVISION
LONG ISLAND CITY 1, NEW YORK
CHICAGO • HOUSTON • LOS ANGELES

face of the metal where their energy is absorbed. There is no magic about infra-red heat. An infra-red B. T. U. is no hotter than a convected B. T. U. and it takes just as many of them to effect a cure on the film. The superiority of the infra-red B. T. U. is that it gets there faster and, when it arrives, does its work more positively and with less loss.

"Infra-red baking created quite a furor. With the utility companies eager to exploit anything that would increase the payload on their power lines, infra-red heating, for a time, got out of hand. However, a few responsible manufacturers worked out accurate engineering data for infra-red ovens and were able to show where they excelled and where they did not. In due time, the advantages and disadvantages became well known, and the art settled down into niches in which it turned in its best performance. Infra-red baking is ideal for flat sheets where the infra-red energy source can be at a fixed distance from the object being baked and the rays can impinge at a 90-degree angle. As the sheets are fabricated into objects of varying size, shape and mass, the efficiency of infra-red baking drops proportionately. Heavy castings further complicate the picture because of the lag in temperature rise caused by the metal mass. Shadows created by protruding parts may cause certain areas to be undercured. In general, infra-red baking has done an admirable job and can be said to have made a major contribution to rapid product finishing.

Induction Heating

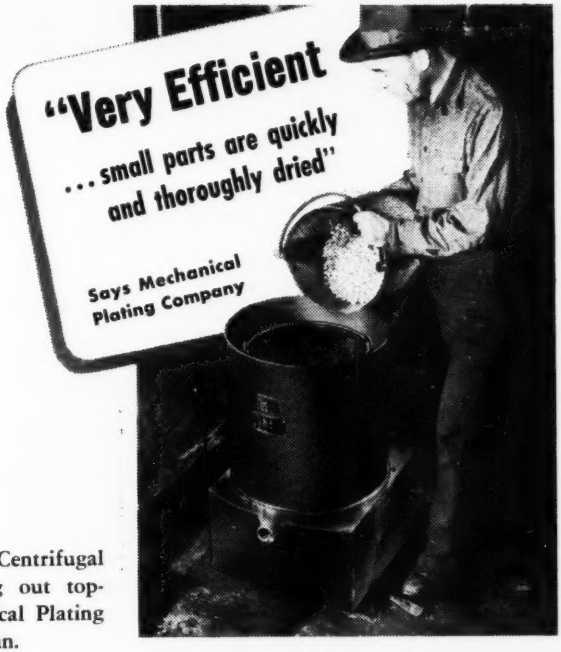
"More recently, induction heating has captured the limelight. In this process, the object to be heated is placed in a magnetic field that is generated by high-frequency induction coils. In the case of an electrically conducting material, a flow of current is induced within the object, resulting in a temperature rise. By using extremely high frequencies, the heat may be generated quickly at the surface of the object. Lower frequencies cause deeper penetration. As in infra-red heating, induction heating is suitable only for articles of uniform shape and mass. The magnetic field must be built to conform to the shape of the object, which necessitates special placing of the coils, a condition that does not lend itself to heterogeneous production.

"In the case of non-conducting materials, the molecules within the substance are caused to change their polarity and, therefore, their position several hundred thousand times a second. This creates internal molecular friction, resulting in the generation of heat.

"Induction or electronic heating, as it is sometimes called, requires a large capital investment for equipment per kilowatt of power intake. It has been widely used for curing resin-bonded plywood and plastic laminates. Such low production at high capital investment, coupled with the fact that electronic heating is only about 50 per cent efficient, renders it non-competitive unless a setup can be arranged where objects of uniform shape and mass can pass on a conveyor through a uniform magnetic or electrostatic field in an interval amounting to only a very few seconds. Even so electronic heating will be costly. It remains for the prospective purchaser to determine whether or not the attained speed justifies the cost."

Coatings for Container Interiors

Peacetime development of special coatings for the interiors of tanks, containers and cans was predicted by Vice-Admiral Edward L. Cochrane, U. S. N., Chief of the Bureau of Ships,



TWO 15-year-old Kreider Centrifugal Dryers are still turning out top-notch work for the Mechanical Plating Company of Detroit, Michigan.

In the words of the plant manager, **"the Kreider is a very efficient dryer. Small intricate parts, threaded parts and parts with deep recesses are quickly and thoroughly dried. The finish on the parts is much superior to the finish on parts dried by any other method we have used."**

Economy is another reason for the popularity of Kreider Dryers at the Mechanical Plating Company. They have speeded up production and cut drying costs. Even with unskilled labor, the only maintenance cost on these dryers, in 15 years, has been the price of one new switch.

A Kreider Centrifugal Dryer may increase the efficiency and economy of your drying operations. Write for complete information and prices.

DELLINGER MANUFACTURING CO.
729 N. Prince St., Lancaster, Pa.

KREIDER *Centrifugal* DRYER

... Dries a basket of small parts in 35 seconds!

who paid tribute to the war effort of the paint, varnish and lacquer manufacturers. "The industry produced a multiplicity of specialized paint materials," he said, "which were indispensable in the war and which will prove equally beneficial in peace. There are the fungus and moisture-resistant lacquers and varnishes which protected our vital radio, radar and other electronic and electrical apparatus in the tropical combat zones where destructive parasites and humidity can put a delicate piece of equipment out of commission in a few hours (see "Jungle Tests for Metal Finishes," page 32, PRODUCTS FINISHING, July, 1945).

"Not the least noteworthy of the accomplishments of the industry was the perfection of coatings such as those for the interiors of steel tanks for shipboard fresh-water storage, designed to prevent not only corrosion but tainting of the water by the film itself. Similar coatings have been devised for the tin cans to store emergency water rations on lifeboats. In the same category are the countless other finishes specially produced to protect the contents of containers of many kinds used to ship vital materials to our men and allies overseas —everything from dehydrated foods to blood plasma."

Prevention of Corrosion

Interesting comment on the prevention of corrosion of aluminum and magnesium alloys was made in a paper by W. F. Kuster, of the Carpenter-Morton Company laboratories. "In this work," he said, "the zinc chromate type of primer is being specified. A high percentage of zinc chromate in a quick-drying, water and chemical-resistant synthetic resin vehicle having an unusually high degree of adhesion is used. However, best results are obtained when the surfaces of the alloys are pretreated by an electrolytic or chemical treatment which leaves a corrosion retarding film that is ideally suited to receive the primer. The use of metallic zinc dust with zinc oxide as a rust inhibiting pigment has been generally used on ferrous metals and particularly over zinc-clad or galvanized iron. The painting of galvanized corrugated iron structures should always be preceded by proper preparation of the surface, such as etching with weak acid or washing with a salt solution or weathering. The binder for the zinc-dust zinc-oxide pigment must be very low in acid value and may be a drying oil or a synthetic resin vehicle. The primer should be top-coated with a durable exterior film to meet the required conditions.

"The prevention of corrosion is not always dependent on the primer coat. In chemical pickling and plating plants where the air is contaminated with varying concentrations of acid or ammonia fumes, the topcoat must be designed to withstand the corrosive action of these chemicals. Here, the topcoat must be composed of non-reactive or chemically inert pigments. The binder may be a chemically inactive resin, such as cumar or phenolic cooked with tung oil, or it may be one of the resins of large molecular structure and excellent chemical resistance, such as chlorinated rubber, vinyl copolymer, and so on. There is a fairly wide choice in this field and each has its advantages and disadvantages. The primer coat is also designed to afford maximum chemical resistance."

Metal Finishes for Aircraft

"The basic foundation for the finish of all aluminum aircraft surfaces, either dural or anodized, is zinc chromate primer," said C. E. Spooner, manager of the Aviation Division of Berry Brothers, who described the

"... in standard salt spray test, prevented the first appearance of white corrosion products on zinc plated steel parts for periods of from 100 to 200 hours"

Unichrome Dip meets our requirements for specification AN-P32a

"... the only commercial coating we found which does not promote corrosion on cadmium plate ... instead it materially increases the corrosion resistance"

ONE DIP DOES IT!

UNICHROME DIP

Prevents Corrosion on Cadmium or Zinc Parts. Handles Bulk Work, No Racking, Fast, Simple, Low Cost Process.

WHETHER YOUR WORK calls for black or olive drab, you get the same fine results. An excellent corrosion resistant finish on cadmium or zinc parts.

A fast, simple process. Valuable operating and production advantages. For instance: no racking or current needed —even for bulk-work; usual bulk equipment often will do; chemical analysis for maintaining the solution is not needed; filtering or agitating not required.

Furthermore, Unichrome Dip does not require frequent additions but can be renewed many times. Then, what many users consider the No. 1 feature—a single short dip and you have your corrosion protection. Parts dry quickly by centrifuge or air blast.

Unichrome Dip is opening up a new era for many operators. We have a lot of information which we will be glad to share with you. Just get in touch with our nearest office giving a brief outline of your problem.

OTHER U. C. PRODUCTS AND PROCESSES TO SERVE YOU

CHROMIUM PLATING for wear-resisting, oil-retaining and other types of finishes.

☆**UNICHROME ALKALINE COPPER** for smooth, lustrous copper plating in a non-cyanide bath.

☆**UNICHROME STRIP** for speedy removal of copper, chromium, zinc, etc., from steel and cast iron without etching the base.

☆**ANOZINC** salts for anodic treatment of zinc giving greatly increased corrosion-resistance.

☆**UNICHROME RACK COATINGS**

☆**UNICHROME STOP-OFF LACQUERS AND COMPOUNDS**

☆**UNICHROME Clear and pigmented LACQUERS**

☆**UCILON**—corrosion-resistant coatings for protecting surfaces against acids, alkalies, water, gasoline and various corrosive chemicals.

☆Trade MarkReg. U. S. Pat. Off.

UNITED CHROMIUM

INCORPORATED

51 East 42nd Street
New York 17, N. Y.

Waterbury 90, Conn.
Detroit 7, Mich.

● ARCC'S liquid strip speeds work where masking film is needed — eliminates use of bothersome tape! Removes cleanly.

● For masking or stop-off lacquering, it is ideal in electroplating — won't plate, and resists moisture.

● Protects goods against weather, for shipment — less expensive than waterproof wrappings.

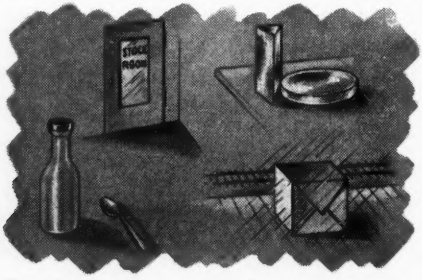
● Coats lenses, crystals and ceramics for shipping protection. One dip — and you eliminate expensive individual wrapping.

● Perfect for overseal on bottle caps. Can be colored for overprinting, too!

● Protects goods in storage.

● Coat display pieces with it — preserves fresh appearance of articles that might tarnish or develop "bloom."

● ARCC Liquid Strip is non-inflammable,



flexible, easy to apply, clean and easy to remove. Resists elements and abrasion!

Write ARCC about your packaging or protection problem — if a special formula is indicated, we will compound it for you!

AMERICAN RESINOUS CHEMICALS CORP.

Main Office and Laboratories Peabody, Mass.
Newark, N. J. Chicago, Ill. Monrovia, Cal.

easy transition from camouflage to gloss finishes in this field when camouflage was found no longer to be necessary. "This change fits nicely into peacetime airline requirements," he said, "as gloss not only provides greater protection and durability for the planes but increases their speed by several miles per hour.

Magnus Aja-Dip Parts Cleaning Machine for cold or hot washing by automotive service shops, metal-working plants, and typewriter repair shops is fully illustrated and described as to construction features and advantages, application, operation, and so on, in a four-page bulletin published by the Equipment Division, Magnus Chemical Co., Inc., 208 South Ave., Garwood, N. J. Copy of Bulletin 200AJ free.

Metalprep Export Grade. A four-page bulletin which describes an export grade of Metalprep No. 10XX that has been specially formulated by the manufacturer for all foreign uses is now available from the Neilson Chemical Co., 6561 Benson St., Detroit 7, Mich. As illustrated and described in the bulletin, this material is useful in the preparation of iron, steel, aluminum terneplate, Galvaneal, galvanized iron, and so on, for painting. Instructions on mixing Metalprep for different cleaning conditions are included in the bulletin, copy of which is available free upon request.

"Modern Coatings Based on Bakelite Resins" is the title of a 24-page booklet published by the Bakelite Corp., 300 Madison Ave., New York 17, N. Y., which contains helpful factual information gathered by this firm through years of experience and close association with the protective coatings industry. The booklet describes the various Bakelite resins used by the coatings industry and shows the high degree of serviceability and durability which may be obtained from these coatings when they are planned and used to maximum effectiveness.

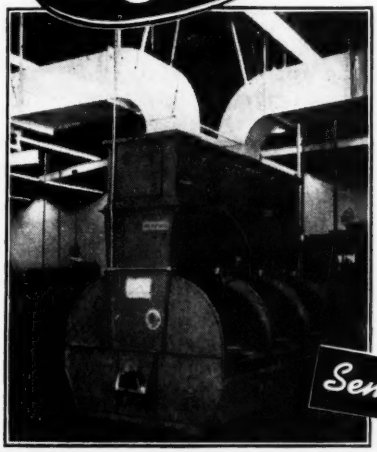
The booklet is profusely illustrated, each captioned picture telling an important story of how Bakelite resin finishes have increased the service life of structures and reduced maintenance costs in the past. Copy free.

Hydro Whirl

SUCCESS

STANDS ON ITS RECORD!

- GREATER EXHAUST *and* COLLECTING EFFICIENCY
- LOWER MAINTENANCE COST, Which, *combined, means a Lower Health Hazard*



- LABORATORY TESTS
- ACTUAL PLANT OPERATION
- CUSTOMERS' TESTIMONIALS

Together *form our Greatest Asset* — **REPUTATION!**

"Hydro-Whirl" Dust Collectors, Spray Booths, Metal Parts Washers and Ovens, all or part for your Finishing System.

EVERY JOB ENGINEERED TO THE LAST DETAIL

Send for Catalog

COMPLETE PROCESSING SYSTEMS

PETERS-DALTON *Incorporated*

RYAN ROAD • DETROIT 12, MICHIGAN

HYDRO-WHIRL DUST COLLECTORS AND SPRAY BOOTHS—INDUSTRIAL OVENS, WASHERS AND VENTILATING SYSTEMS

Electricity for the Plater

D. A. COTTON

Part V

RESUMING our discussion of the current-carrying capacities of conductors, the statement was made in the previous article that a safe temperature for conductors depends mainly upon the use of a cross-sectional area sufficiently ample for the current to be carried. The circular mil area allowed per ampere also, obviously, determines how great the voltage drop in the line will be.

Safe values have all been carefully worked out and the National Electric Code of the Fire Underwriters specifies the allowable current to be carried by various size conductors. Naturally, these values vary for different conditions such as the extent to which the conductors are ventilated and also according to the type of insulation on the conductors.

Since electroplating requires the use of low voltages and high currents, the conductors are usually heavy copper bars or rods, and, therefore, Table III herewith omits conductors below 200,000 circular mil section.

This table gives the values of current specified by the 1937 and 1940 National Electric Codes for rubber insulated wire. These values are for copper of 98 per cent conductivity and for one conductor in free air at room temperature of 30 deg. C. or 86 deg. F. The fourth and fifth columns have been added to show the circular mils allowed per ampere.

These codes also state that "the maximum permissible current shall be 1,000 amperes per square inch of cross-section in unventilated inclosures and 1,200 amperes per square inch in ventilated ducts. Current carried continuously in bare conductors in auxiliary gutters shall not exceed 1,000 amperes per square inch." This is probably a safe allowance for bars up to size 4 x 0.25 inch (one square inch cross-section).

Note that 1,000 amperes per square inch is 1,000 amperes for 1,273,000 circular mils or 1,273 circular mils per ampere, which is regarded as safe for bars up to approximately 1,300,000 circular mil cross-section. Also note in the table that for the rubber covered-conductor of 1,300,000 circular mil section only about 760 amperes are allowed. It is to be kept in mind that these Code values are given primarily for the purpose of

TABLE III

Circular Mils Cross-Section	Amperes Allowed 1937	1940	Circular Mils per Ampere 1937	1940
200,000	200	—	1000	—
250,000	250	280	1000	895
300,000	275	310	1090	970
350,000	300	350	1165	1000
400,000	325	380	1230	1050
500,000	400	430	1250	1160
600,000	450	480	1330	1250
700,000	500	525	1400	1330
750,000	525	545	1410	1370
800,000	550	565	1450	1415
900,000	600	605	1500	1485
1,000,000	650	650	1540	1540
1,100,000	690	—	1600	—
1,200,000	730	—	1650	—
1,250,000	—	740	—	1690
1,300,000	770	—	1690	—
1,400,000	810	—	1730	—
1,500,000	850	815	1770	1840
1,600,000	890	—	1800	—
1,750,000	—	890	—	1970
1,800,000	970	—	1860	—
1,900,000	1010	—	1880	—
2,000,000	1050	960	1900	2080

preventing wires from becoming hot enough to cause fires. They are first of all concerned with current-carrying capacity and not with such related factors as voltage drop in lines, power losses, and so on. When aluminum conductors are used, the currents allowed are only 84 per cent of those for copper under the same conditions.

During World War II, the Government has required a return to the 1937 Code in order to conserve copper. It will be noted from a study of Table III and the curves shown in Fig. 22 that the 1937 Code allows more circular mils per ampere than the 1940 in the smaller sizes of conductor up to about 1,000,000 circular mil section. From this size up, the 1937 Code drops below that of 1940 in circular mil allowance per ampere.

Although the plater uses larger conductors as a rule, it would hardly be logical to leave this discussion without a brief consideration of the smaller wire sizes. The methods already discussed for calculating resistance by means of the formula $R = \frac{10.37\ L}{A}$ where A is area in circular mils, or $R = \frac{10.37\ L}{D^2}$ where D is diameter in mils are by all means the simplest.

Practically every plater is familiar with the use of the micrometer calipers which are used for measuring dimensions in thousandths. However, everyone doing practical work with electricity should have a working knowledge of the fundamentals of wire gauge systems and the use of wire tables.

Many different systems of wire

gauges have been in use in past years. Some of these are Washburn & Moen, Roebling, Stubs, and so on. However, in the United States, practically the only gauges now in extensive use are the American Wire Gauge, used for electrical conductors, and the Steel Wire Gauge, used for steel wire. The American Wire Gauge is known also as the Brown & Sharpe, abbreviated to B & S.

Wire measuring gauges made of hardened steel plate are also used for determining wire gauge numbers. Figure 23 shows such a gauge for B & S wire sizes. The wire to be measured is slipped successively into the various slots until one is found in which the wire fits. Its gauge number is indicated by a number opposite the slot.

The American Wire Gauge system is based on a simple geometric progressional ratio between the diameters of the successive sizes of wire. That is, the diameter of any wire may be found by multiplying the diameter of the next larger by 0.8905 or the diameter of the next smaller by 1.1229. These constants are derived as follows. Number 0000 B & S gauge has a diamenter of 460 mils and No. 36 of 5 mils.

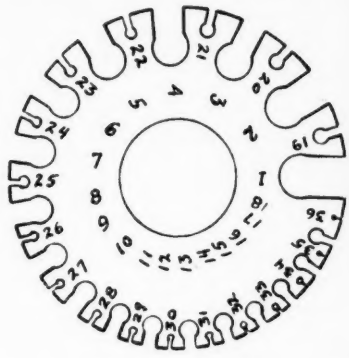


Fig. 23—American Wire Gauge (Brown & Sharpe)

Thus, the ratio of the largest to the smallest diameter is 460 ÷ 5 or 92. The diameter, therefore, increases from smallest to largest in 39 equal steps. Consequently, if we let **R** be the ratio between the diameter of any wire and that of the next larger diameter, **R** to the 39th power equals 92 or $R^{39} = 92$. Then, **R** equals the 39th root of 92 or R = 1.1229. The reciprocal of this factor or $\frac{1}{1.1229} = 0.8905$ which is the constant ratio between successive diameters, progressing from large to small sizes.

For reference, a part of a B & S wire table is introduced at this point. Only sizes down to No. 14 are included since sizes below this are not allowed by the National Electric Code for wiring purposes.

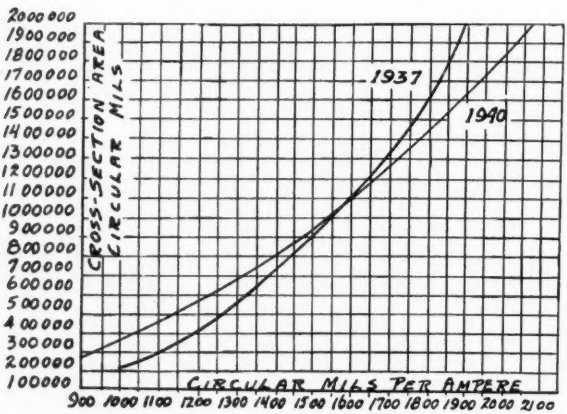


Fig. 22—Circular mil per ampere allowance in N.E. Codes

The coating of surfaces with Rayco Flock has infinite possibilities in product design—as indicated by the suggestive Functional and Decorative lists below. These textile or hair particles can be permanently adhered to any surface, either over-all or to selected areas. Application can be at any stage of fabrication of a component or complete product. Inform yourself about Flock's possibilities with relation to your field of manufacture.

FUNCTIONAL	DECORATIVE
Used in airplane, auto and numerous other industries for— **SOUND DEADENING • TEMPERATURE INSULATION • INTEGRAL GASKETS • SHOCK ABSORBING SURFACE • NON-MAR SURFACE PROTECTION.**	Applied in various lengths and colors to wood, paper, cloth, metal, etc., the following effects are produced— **SUEDE LEATHER • FURNITURE UPHOLSTERY FABRICS • AIRPLANE AND AUTO UPHOLSTERY FABRICS • VELVET • VELOUR • MOHAIR.**

Engineering Information Prices and Samples Upon Request

RAYON PROCESSING CO. of R.I. INC.

65 TREMONT ST., CENTRAL FALLS, RHODE ISLAND

Developers and Manufacturers of Printing and Coating Flock

TABLE IV

B & S Gauge No.	Diameter Mils	Cross-Section Circular Mils	Ohms per 1000 Feet at 20° C. or 68° F.
0000	460	212,000	0.0490
000	410	168,000	0.0618
00	365	133,000	0.0779
0	325	106,000	0.0983
1	289	83,700	0.1239
2	258	66,400	0.1563
3	229	52,600	0.1970
4	204	41,700	0.2485
5	182	33,100	0.3133
6	162	26,300	0.3951
7	144	20,800	0.4982
8	128	16,500	0.6282
9	114	13,100	0.7921
10	102	10,400	0.9989
11	91	8,230	1,260
12	81	6,530	1.588
13	72	5,180	2.003
14	64	4,110	2 525

The Bureau of Standards Circular No. 31 on Copper Wire Tables gives a few interesting short cuts for determining such factors as diameter, area, resistance, and weight of wires starting with a gauge number having easily remembered constants. These short cuts are made possible by reason of the uniform variation between sizes.

For example:

$$1.1229^3 = 1.261 \quad (1)$$
$$1.1229^4 = 1.600 \quad (2)$$
$$1.1229^9 = 2.005 \quad (3)$$
$$1.261^{10} = 10.000 \quad (4)$$

Thus, (a) every three gauge numbers, the area, the weight, and the resistance per given length are halved or doubled; (b) every ten gauge numbers, the above factors are multiplied or divided by approximately ten; (c) every six gauge numbers, the diameter is halved or doubled; (d) a next larger wire weighs approximately 1.26 as much as the next smaller one; and (e) the reciprocal of the gauge number is equal approximately to the wire diameter in inches for the sizes from No. 6 to No. 12 inclusive. Now let us consider a few applications of these short cuts. A good wire size to memorize for reference is B & S No. 10 which has the following constants:

Gauge No. 10

Diameter, 0.10 inch or 100 mils (actually 0.120).

Cross-Section, 10,000 circular mils (actually 10,380).

Resistance, 1 ohm per 1,000 feet (actually 0.9989).

Weight per 1,000 feet, 31.4 lb.

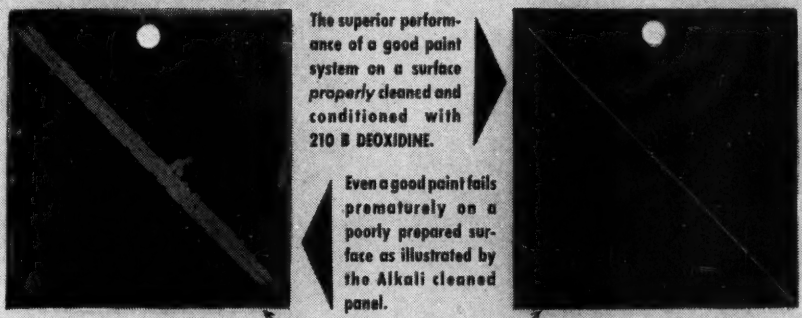
Example (1):

What is the approximate diameter of No. 6 wire? Using short cut (e), the reciprocal of the gauge number is $\frac{1}{6} = 0.167$ inch (actually 0.164).

Example (2):

What size wire would have a resistance of about 0.25 ohm per 1000 feet? Use short cut (a). Since the resistance of our reference wire No. 10 is 1 ohm per 1,000 feet and

Paint Finishes Endure on Properly Cleaned and Conditioned Surfaces


The superior performance of a good paint system on a surface *properly* cleaned and conditioned with 210 B DEOXIDINE.
Even a good paint fails prematurely on a poorly prepared surface as illustrated by the Alkali cleaned panel.
CLEANED with ALKALI
CLEANED and CONDITIONED with 210 B DEOXIDINE
Identical Salt Spray Exposure

CLEAN AND CONDITION SHEET METAL with 210B DEOXIDINE

THE 210 B DEOXIDINE process is the simplest and most advanced procedure in metal preparation for paint. A minimum of low-cost operating equipment is required therefore, less than the usual amount of operating space is needed. The fewer necessary operations cut the production costs. Time and labor are saved and better results obtained.

APPLICABLE TO LARGE METAL PRODUCTION
210 B DEOXIDINE is ideal for completely mechanized spray process in power spray washers constructed of mild steel. A three stage washer is usually sufficient, but four stages are preferable if drawing compounds are present.

A NATURAL FOR THE SMALL PRODUCTION PLANT
210 B DEOXIDINE does not require expensive stainless steel equipment. Three stage washers which have previously been used for alkali cleaning can be used. The simplicity of controls of 210 B Deoxidine bath and process lead to uniformly good results.

210 B DEOXIDINE is but one of several war-proved Deoxidines — each created to meet different conditions. ACP Technicians will gladly advise with you and suggest the particular ACP products and processes which will efficiently meet your cleaning and conditioning problems. Write to Dept. A-12.

MANUFACTURERS OF INHIBITORS AND METAL WORKING CHEMICALS

AMERICAN CHEMICAL PAINT CO.

Office and Warehouse
3665 Palmer Ave., Detroit, Mich.
AMBLER
ACP
PENNA.
Canadian Office and Factory
Walkerville, Ontario

DISTRIBUTORS

West Coast
Leon Finch, Ltd., 728 E. 59th St.
Los Angeles, Cal.

Metropolitan New York Area
Bricker & Andes, 318 Atlantic Ave.
Brooklyn, N. Y.

Eastern Ontario and Quebec
Van Camp Products & Sales Co.
177 Parliament St., Toronto, Ont.

since the resistance is halved every three gauge numbers, it would be divided by four every six gauge numbers toward the larger sizes. Therefore, 10 — 6 = 4 or No. 4 wire would have about 0.25 ohm resistance per 1000 feet (actually 0.2485).

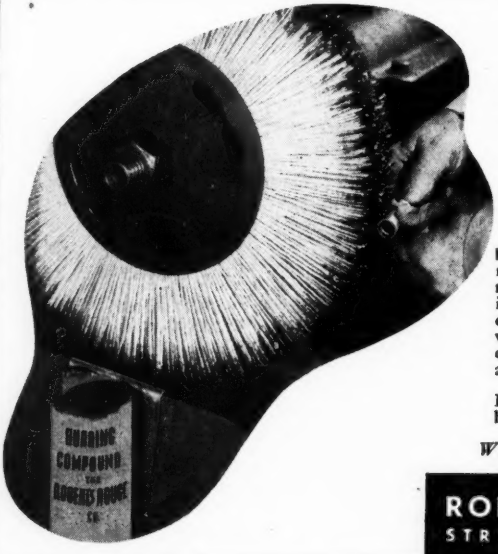
Example (3):

About what is the weight of No. 3 wire per 1,000 feet? The weight of No. 10 wire is 31.4 lb. per 1,000 feet and, using short cut (a), we know that every three sizes the weight doubles and every six sizes it is multiplied by four. Therefore, No. 4 wire would weigh 4 x 31.4 lb. or 125.6 lb. By short cut (d) we know that No. 3 wire would weigh 1.26 x 125.6 or 158 lb. per 1,000 feet, (actually 159.3).

The next article in the series will discuss the electrical principles which underly the operation of switchboard meters used in plating.

"Your Product Must Look Good and Be Good" is the title of a 12-page booklet published by the Special Chemicals Co., 38 Irving Place, New York 3, N. Y. The booklet provides descriptive and price list information concerning "Spekwite" tri-metal alloy white electroplate; "Spekyello" tri-metal alloy yellow plate; "Dipwite" white decorative finish; "Smutbath" alloy electroplate; "Spekleen" No. 51 rust-inhibiting dip for iron and steel; "AquiFlux" jewelers self-pickling flux; "Spekaluminite," and other products. Copy free upon request.

Dow Corning Silicones. A 12-page catalog listing all of the Dow Corning silicone products now available and containing many charts and graphs demonstrating the unusual properties of this rapidly increasing family of organo-silicon-oxide polymers has been published by the Dow Corning Corp., P. O. Box 592, Midland, Mich. The silicones are produced in many forms, including fluids, greases and compounds, resins and varnishes, and Silastic—the Dow Corning silicone rubber—all of which are described in the catalog. Copy free upon request.



SOLVE

Burring Problems

with

ROBERTS Compounds

ROBERTS COMPOUNDS quickly remove burrs, sharp edges and fragmented metal on the work piece, leaving a polished surface with good color and all remaining tool marks well blended. Preserves all essential dimensions. Adheres to wire wheels as well as Tampico wheels.

Reduces wear on buffs and wheels because of its fast cutting action.

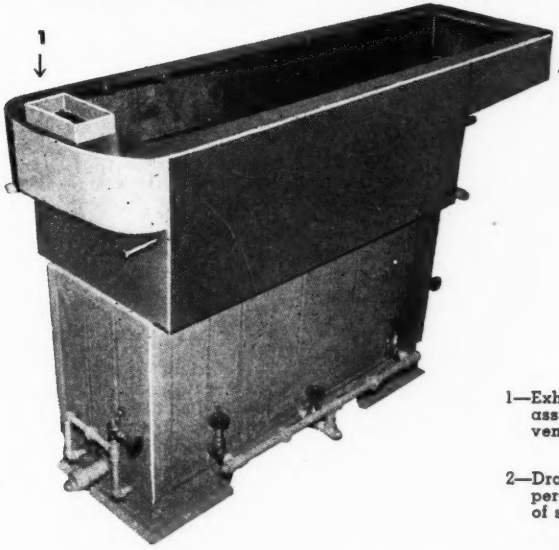
Write for samples and suggestions.

ROBERTS ROUGE CO.
STRATFORD • CONN.

3 DIP
D'OILER Solvent Degreaser

Boiling Solvent - Warm Solvent - Vapor Rinse

CLEANS RADAR PARTS PERFECTLY



1—Exhaust Duct assures proper ventilation.

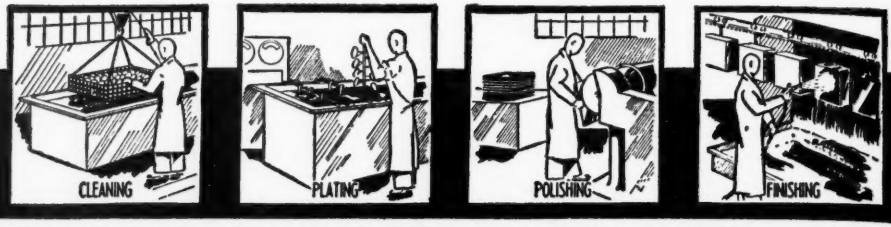
2—Drain Table permits recovery of solvent.

The unique and proven design engineered into every D'Oiler Solvent Degreaser is successfully serving leading manufacturers of precision radar parts. A typical installation such as pictured incorporates a complete fume exhaust duct as standard equipment. This feature assures proper ventilation for the operator. The built-in drain table provides adequate drainage and promotes important saving of solvent. All-around insulation cuts heat losses to minimum thus, contributing further to economical operation.

It will pay to investigate the D'OILER factors of high operating efficiency and low cost on your peacetime production. Investigate NOW!

MECHANICAL PROCESS CO.

15 VALLEY ST. SOUTH ORANGE, N. J.



News of the Industry

Pennsalt Additions

Dr. S. C. Ogburn, Jr., manager, Research and Development Department, Pennsylvania Salt Manufacturing Co., Philadelphia, Pa., announces the following additions to the Research and Development staff:

Dr. E. B. Gunyou, formerly with the Production Division, U. S. Army Service Forces and liaison officer to the Chemicals Bureau, WPB, has been appointed assistant to the manager of the Research and Development Department. Prior to his army service, he served as development engineer for the Grasselli Chemicals Department of the Du Pont Company. Dr. Gunyou will be located at the company's general offices, 1000 Widener Building, Philadelphia.

Dr. Harry G. Walker, research entomologist of Virginia Truck Experiment Station, Norfolk, Va., will have immediate charge of the development of new and improved agricultural chemicals. He has been previously associated with the Ohio Agricultural Experiment Station and the Crop Protection Institute, and is author of numerous publications dealing with research investigations and field studies in agricultural chemicals.

Dr. Thaddeus Parr, previously with the Bureau of Entomology and Plant Quarantine, U.S.D.A., has been appointed senior research entomologist. He will be located at the company's Whitemarsh Research Laboratories. Prior to his association with U.S.D.A., Dr. Parr served with the U. S. Forest Service and the Royal Swedish Experiment Station, Stockholm, Sweden.

Murray Zakheim, chemist at the Defense Plant Corporation, Cornwells Heights, Pa., operated by Pennsylvania Salt Manufacturing Company, has been transferred to the Research and Development Department. He will be associated with the agricultural chemicals group at Whitemarsh Research Laboratories.

Appointed Vice President and General Manager

According to an announcement made by Ross Kyger, president, W. C. McCaslin has been appointed vice president and general manager of the Sewall Paint and Varnish Co., Kansas City. Mr. McCaslin formerly held various important positions with the Phelan-Faust Paint Manufacturing Company with whom he had 18 years of service. He is also an active member of the St. Louis Paint Club and the Purchasing Agents' Association.

Transferred to Los Angeles Office

William B. Bisker, for the past six years with the Advertising Department of E. I. du Pont de Nemours & Company at Wilmington, Del., and Arlington, N. J., has been transferred to the Los Angeles office of the company's Plastics Department as a junior salesman.

Mr. Bisker, who has been closely associated with the advertising and sales promotion of Du Pont finishes and plastics, will take over the duties of Harold H. Dunphy, recently transferred to New England.

Richard H. Turk Re-Elected President of P.E.I.

At the annual meeting recently held in Pittsburgh, Richard H. Turk, executive vice president of the Pemco Corp., Baltimore, Md., was re-elected president of the Porcelain Enamel Institute of Washington.

Three vice presidents were also elected—H. R. Spencer, Erie Enameling Co., Erie, Pa.; W. A. Barrows, W. A. Barrows Porcelain Enamel Co., Cincinnati Ohio; and J. T. Penton, California Metal Enameling Co., Los Angeles, California.

Interchemical Forms Finishes Division

The operations of the Ault & Wiborg Division of Interchemical Corporation and Murphy Finishes Corporation, an Interchemical subsidiary, were consolidated recently and will be continued by Interchemical Corporation Finishes Division, it has been announced by Joseph R. Esposito and Charles J. Roh, the respective heads of these two units. Both firms are well-known manufacturers of enamels, lacquers, varnishes, paints, and other finishes.

Ault & Wilborg, established in 1878,

Charles J. Roh

has been a member of the Interchemical group since 1928. Late in 1944, Interchemical expanded its position in the finishes field when its subsidiary, Murphy Finishes Corporation, acquired the assets and business of the Murphy Varnish Company which dates its experience back to 1866.

Operating as a single unit, the Finishes Division will have the benefit of the research facilities of both firms,

Joseph R. Esposito

augmented by the fundamental research program of Interchemical Corporation, as well as a nation-wide integrated network of factories, warehouses, laboratories and service stations. Industrial products formerly sold under the names of Ault & Wiborg and Murphy will now be sold as Interchemical products. The Murphy brand name and trade mark will be retained for consumer products.

Officers of the new division, which will have its headquarters in the Empire State Building, New York City, are Charles J. Roh, division chairman; Joseph R. Esposito, division president; Joseph G. Morris, division executive vice president; Paul S. Kennedy and Mark Frishkorn, division vice presidents.

Named Treasurer

Warner R. Over has been named treasurer of the Pennsylvania Salt Manufacturing Company following the retirement of L. A. Smith who served as vice president and treasurer.

Mr. Over, who joined Pennsalt as a clerk in 1904, was appointed secretary of the company in 1940, combining this with the title of assistant treasurer. He will now act as secretary-treasurer. Mr. Over is a native of Philadelphia.

Standard Varnish Appoints Erb

J. Heath Wood, president of Standard Varnish Works, has announced the appointment of Charles E. Erb as manager of production efficiency. Mr. Erb was formerly in the engineering department of Standard Varnish in charge of the development and adaptation of Corex and other types of resistant industrial finishes.

In his new assignment, Mr. Erb will have charge of coordinating the activities of the various plants to increase production, improve efficiency, cut production costs, and especially to put in practice operations and utilize equipment developed through wartime demands. He will make his headquarters at the Chicago plant at 2600 Federal Street.

Merger Proposed

A proposed merger of the Parker-Wolverine Company with The Udylite Corporation, both of Detroit, was agreed upon by directors of both corporations and will be submitted at meetings of shareholders of both companies on February 20, 1946. The Udylite Corporation, producer of all types of metal-finishing equipment and supplies, operates three Detroit plants. Parker-Wolverine produces finished fabricated parts and renders metal-finishing service from five Detroit plants.

The proposed merger provides for issuance of 2½ shares of Udylite stock for each of the 135,931 shares of outstanding Parker-Wolverine stock. Charles H. Awkerman, chairman of the board, L. K. Lindahl, president, Clyde H. Reeme, vice president and treasurer, and Horace S. Maynard, secretary, along with Willard M. Cornelius and Luis E. Eckelmann are the directors of The Udylite Corporation. They will continue as officers and directors of the continuing corporation.

Pemco Adds to Research and Development Staff

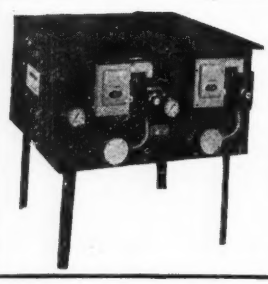
The Pemco Corporation has announced the addition of R. Wayne Gates to its research and development staff. Mr. Gates graduated in 1940 from the University of Illinois with an M.S. in ceramics. He entered the Army in 1940 and was honorably discharged with a rank of second lieutenant.

Pemco also announces that John Steencken is now a part of its service organization and that William Cooper of its laboratory staff is now at the University of Ohio doing research work for the United States Government.

United Chromium Adds Chicago Branch

To accommodate its expanding sales activities and to provide for further convenience and service to its clients, United Chromium, Inc., has added a Chicago branch to its list of district offices. Located at 205 S. La Salle St., Chicago 4, Ill., this branch will serve the Central States territory from Wisconsin and Minnesota to Texas and Louisiana.

E M. Relitz, long associated with the company, has been appointed district manager. Well known in the field, Mr. Relitz has an extensive and thorough background in all phases of the product finishing industry. Attached to this office to assist him are C. W. Carter. Gordon Einberger, Frank Keeley, and Randolph Stark.



SPEED RUST PROOFING AND METAL CLEANING WITH

COOPER'S DOUBLE VICTORY TANK

(two complete tanks in one)

ELECTRICALLY HEATED — THERMOSTAT CONTROL

One man can do the work of 3 to 5 men with COOPER'S DOUBLE VICTORY TANK. Use one side for heating Rust Preventives and second compartment for Wax or one tank for cleaning metals and second compartment for Rinse. A multitude of uses.

D. C. COOPER CO.

1467 S. Michigan Ave. Harrison 8047 Chicago 5, Illinois

SPECIFY USA BRAND

U.S.A.
D

FELT WHEELS

and you will get the best that money can buy.

Five standard (A, B, C, D, E) and five special (A+, B+, C+, D+, E+) densities provide a wide range to select the wheel best suited for your work.

Manufacturers of Felt Wheels and Sheet Felts since 1896.

EASTERN FELT COMPANY

Manufacturers

80 CANAL ST., WINCHESTER, MASS.

PUT THIS INDUSTRIAL GIANT TO WORK FOR *you!*

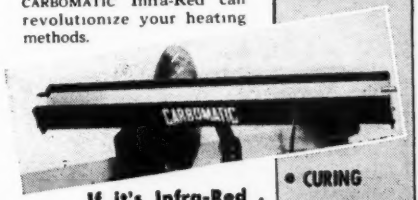
CARBOMATIC INFRA-RED

GAS OR ELECTRIC UNITS

- DRYING
- SINGEING
- BAKING
- PRE-HEATING
- ANNEALING

Amazing economies are typical of CARBOMATIC Infra-Red installations now in use in many textile plants. We suggest that you investigate the possibilities of this modern industrial giant.

Our engineering department will be glad to show you how CARBOMATIC Infra-Red can revolutionize your heating methods.



- CURING
- ROASTING
- CARBONIZING

If it's Infra-Red . Be Sure It's CARBOMATIC!

Send for Comprehensive Broadside PF12.

INFRA-RED DIVISION

CARBOMATIC CORPORATION

117 WEST 63rd ST. • NEW YORK 23, N. Y.

Also—H. W. Butterworth & Sons Co., Philadelphia, Pa.
In Canada—Canadian Textile Engrg. Ltd.
980 St. Antoine Street, Montreal, P. Q.

Harshaw Awarded Four-Star Army-Navy "E" Flag

A four-star Army-Navy "E" flag was recently awarded by the Manhattan Engineer District to the 640 employees of the Harshaw Chemical Company Cleveland plant and office in recognition of the research, development, and production work performed by the company on several different chemicals essential to the atomic bomb. The award is the only one given in Ohio by the Manhattan Engineer District, the group responsible for the entire project. The four-star award received by Harshaw is one of only two given in the entire country.

The "E" flag with four stars is equivalent to the company having won the award each six months for the past 2½years. Actually, Harshaw had been actively engaged in certain phases of research designed to release the energy of the atom in modern warfare before the Manhattan Project had officially taken shape. The strict secrecy imposed on the work prevented this special award from being made until security regulations were released recently.

PLASTEX

(Trade Mark Reg.)

COLOR COAT

A BEAUTIFUL PROTECTIVE FINISH For ALUMINUM, MAGNESIUM ZINC, BRASS, STEEL

- **Adheres To Any Surface**
- **TOUGH and FLEXIBLE**
- **WATERPROOF**
- **Resists Most ACID, ALKALI or BRINE SOLUTIONS or VAPORS**
- **Unaffected by ALCOHOL, LUBRICATING OILS or GASOLINE**

Supplied Clear and in 19 Colors.
Write for Color Card Today.

STEEL PROTECTION & CHEMICAL CO., INC.

Mooresville 3, Indiana

SVW Technical Sales Representative

M. H. Corbin, vice president and director of sales of the Standard Varnish Works has announced the appointment of Landon Browne as technical sales representative in Upper New York State and Northwestern Pennsylvania.

Mr. Browne has been associated with the company as a chemist in its laboratories for many years. His appointment is in accordance with the policy of the company, thus enabling its representatives to contribute considerable technical advice and service to its customers which will be mutually advantageous.

Arco Appointments

Dr. Eugene W. Kanning, research director of The Arco Company, Cleveland paint manufacturer, has announced the appointment of J. J. McCormick as manager of the Products Development Laboratory and Dr. Edward G. Bobalek as manager of the Resin Research Department. Mr. McCormick is a chemical engineering graduate of Rose Polytechnic Institute and for 13 years was chief chemist of the Dibble Color Company, Detroit. Dr. Bobalek holds degrees from St. Mary's College, Creighton University, and Indiana University and was a research chemist with the Dow Chemical Company until he joined Arco.

Two other men recently appointed to Arco's technical staff in anticipation of the opening of its new research laboratory after the first of the year are Robert C. Krueger, research chemist in the Products Development Laboratory, and Edward C. Hart, research chemist on special problems in the Resin Research Department. Mr. Krueger is a graduate of Case School of Applied Science and holds a masters degree in chemical engineering from the University of Louisville. A native Clevelander, he spent 9 years with the Jones-Dabney Company of Louisville in testing and research work and for the past year and a half has been with the Parker Appliance Company where he was engaged in research on electroplating methods.

Mr. Hart holds degrees from Michigan State College and Indiana University. For the past three years, he has been engaged in the special research on coatings and adhesives for the Dow Chemical Company.

BARBER-COLMAN

TYPE YBA
TWO-POSITION VALVE

MOTOR-OPERATED VALVES FOR FINISHING CONTROL

Barber-Colman *electric* Motor-Operated Valves offer a number of advantages for the control of plating tanks, anodizing baths, and many other finishing operations where uniform temperature must be maintained for best results. Reliable shut-off is provided by positive power-driven seating. Current is consumed only when the valve is changing position. Motors are available for either high-voltage or low-voltage lines. Control can be by thermostat, by standard contact-making recorder-controller, or by remote manual switches.

Write for Bulletin
"CONTROLS FOR INDUSTRY"

BARBER-COLMAN COMPANY
1248 ROCK ST. • ROCKFORD, ILL.

NEW ROTOMATIC VAPOR DEGREASER

CONVEYORIZED *Performance Controlled* CLEANING CYCLE

AT OPEN DEGREASER COST

MORE ECONOMY *LESS TOXICITY*

USING PHILLSOLV . . . *the Safe, High efficiency, premium vapor degreasing solvent.*

Manufacturers of a Complete Line of Metal Cleaning Machinery

PHILLIPS MANUFACTURING CO.

3441 W. TOUHY AVE. CHICAGO 45, ILL.

Write for Complete Details.
Distributors in All Principal Cities

Arthur E. Gibbs Retires

Arthur E. Gibbs, advisory technical director of the Pennsylvania Salt Manufacturing Company and the firm's first director of research, has retired to return to his home in England. Mr. Gibbs joined Pennsylvania Salt in August of 1903 to develop the first electrolytic cell.

Following the development of the chlorine cell at Wyandotte, Mr. Gibbs, in 1908, was chosen as the company's first director of research with the organization of the department at Wyandotte. In 1912, the director and his staff were moved to the Greenwich plant near Philadelphia where the newer research and development department was established. In 1915, Mr. Gibbs moved to the general offices of the company as manager of research and development and remained at that post until 1930. He then resigned his position to continue as a member of the department in the capacity of advisory technical director.

During his career with the company, Mr. Gibbs has been active in the American Ceramic Society, the American Chemical Society, American Institute of Chemical Engineers, Chemists' Club of New York Electrochemical Society, Engineers Club of Philadelphia, and the Franklin Institute.

Quaker Adds Five Field Engineers

The Quaker Chemical Products Corp., Conshohocken, Pa., announces the addition of five men to its staff of field engineers.

John N. Carlson, formerly employed as engineer and metallurgist by several leading aircraft and ball bearing manufacturers, has taken over the Philadelphia territory formerly serviced by Peter J. Schwab, who has retired after more than 25 years with the Quaker organization. Charles D. Titer, formerly engaged in chemical works for Robbins & Myers, Inc., is now representing Quaker in Springfield, Ohio, and adjacent territory. James D. Stevens, Jr., formerly a process engineer with Wright Aeronautical Corp., will service the states of Wisconsin and Minnesota from his headquarters in Milwaukee.

Roger M. Baker, a graduate of Pennsylvania State College and former maintenance superintendent of Consolidated Vultee Aircraft Corp., Allentown, Pa., is now servicing the Cleveland, Ohio area for Quaker. Sharing the Cleveland territory with Mr. Baker is Grant H. Lewis, who before coming with Quaker served as assistant to the works manager of the Dodge Chicago Division of Chrylser Corporation. Mr. Lewis, who attended the University of Cincinnati and holds a B. S. degree in mechanical engineering, brings to his new position a knowledge gained through years of experience in process, production, and tool engineering.

ALLWOOD

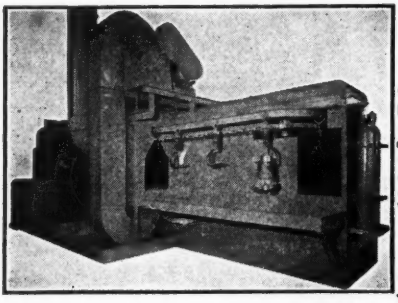
"Vienna Brand" Lime

Made from Limestone that is identical in chemical analysis and geological structure with European Imported Lime. Tests show a "lime cake" made from Allwood "Vienna Brand" Lime equals the finish made from imported lime.

WRITE FOR FULL PARTICULARS

ALLWOOD LIME COMPANY

Manitowoc • Wisconsin



HYDRO-FLOW

INDUSTRIAL WASHING MACHINES

Streamlined design. Recirculating hot or cold air blow off. Hidden motors, pumps and pipes are easily accessible. Piping and nozzles located to insure thorough cleansing of all surfaces. Rugged and efficient pressure pump. Corrosion resistant spray nozzles—from mist to open stream. Handling alkali to varsol as cleaner. Monorail, Belt, or Gravity type conveyors designed to carry any shape or size material. Variable speeds on conveyor drive synchronize production.

INTERNATIONAL CONVEYOR & WASHER CORP.

Write for circular.

652 E. FORT ST. DETROIT 26, MICH.

If its metal polishing or metal finishing you want, check LUPOMATIC.

For efficiency in finishing metal parts, install a DEBURRMASTER.

Save time, money and produce assured results.

LUPOMATIC TUMBLING MACHINE CO., INC.
4510 BULLARD AVE. BRONX, N. Y.

FORM-A-ROC - W

A Perfected White Alkyd-amine Baking Enamel

Complete hiding power, great adhesion, remarkable flexibility coupled with high surface hardness.

Baking schedules from one minute at 425 degrees F. to one hour at 150 degrees F. available.

Form-A-Roc formulation are also available in a wide range of colors and in a clear, tough, resistant topcoat.

•

The Varnish Products Co.

5206 Harvard Ave.
Cleveland, Ohio

Having Trouble Removing the Paint?

USE FIDELITY

Stripping Compounds

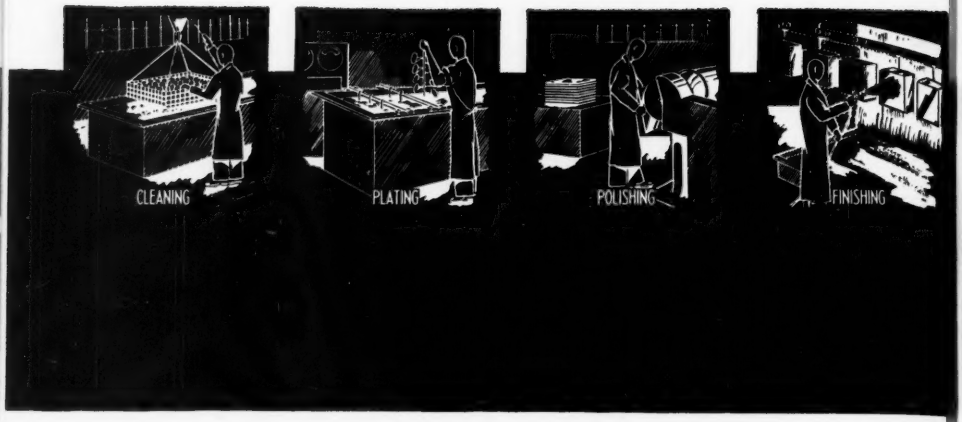
Her "paint" has been on for only a few hours and yet she's having trouble removing it. In contrast, the coatings of paint that you run into may have been on for many years. To get them off, you must use efficient stripping compounds — materials that dig in and get right down to the surface of the bare metal.

The Fidelity label on such compounds is a guarantee of dependability and satisfactory performance. Write or phone us your stripping and cleaning requirements.

FIDELITY CHEMICAL PRODUCTS CORP.

430 RIVERSIDE AVE.
NEWARK 4, N. J.
HUmbolt 3-3640

"Serving industry with cleaning and stripping compounds"



Cooper Metal Parts Washer

The D. C. Cooper Co., 20 E. 18th St., Chicago 16, Ill., announces the development of a metal parts washer for large or small plants. The washer is equipped with a special spray hose, electric motor, spray pump, and sturdy basket for handling small parts. A special gage also provided indicates at a glance the amount of solvent in the tank.

In using the Cooper Metal Parts Washer, only one cleaning operation is said to be required for all types of metals, including aluminum, pewter, white metal, steel, and iron.

Cooper Metal Parts Washer

Comtor Quick Scanning Surface Comparator

The Comtor Quick Scanning Surface Comparator illustrated herewith, product of The Comtor Co., 64 Rumford Ave., Waltham 54, Mass., is designed to provide a unique means for inspecting the smoothness of finished surfaces. The unit consists of a photoelectric scanning head, a self-contained amplifier with calibrating controls, a finish meter with tolerance markers and ball bearing work-holding carriage. According to the manufacturer, critical adjustment of the scanning head is unnecessary since its response, although sensitive to the smallest differences in smoothness, is independent of the direction of the finish grain.

The amplifier is contained in the base of the comparator and its zero-setting, calibrating, and sensitivity controls are mounted on the front panels of the base. The finish meter is graduated so that readings represent the smoothness of the part being inspected as a per-

Ballou's Metal Finishes

Will improve the appearance of your products and duplicate closely real plated finishes—

- Super Bright Gold Bronze Powders
- Super Bright Copper Bronze Powders
- Chrome Aluminum Paint
- Chrome Aluminum Paste
- Aluminum Powders and Pastes

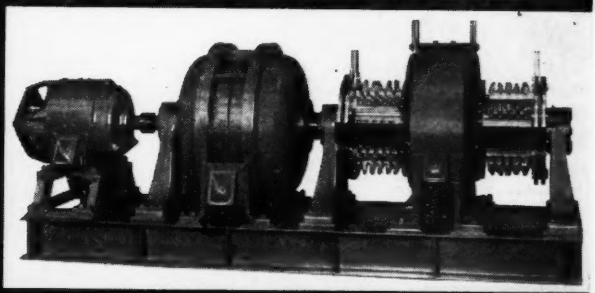
Send for samples and prices.

EDWARD C. BALLOU CO.

6 VARICK STREET NEW YORK 13, N. Y.

COLUMBIA **MOTOR GENERATORS**

for Electroplating and other Electrolytic Processes



Columbia Generators embody every feature essential for dependable, 24-hour operation. They are built for electroplating service in sizes of 6 to 20 volts, 500 to 20,000 amperes, for anodic treatment of aluminum in sizes of 40, 50, and 60 volts, 500 to 3,000 amperes. Columbia Generators for other electrolytic processes range from ½ to 250 KW, 100 to 40,000 amperes, 6 to 60 volts. Write for full information.

COLUMBIA ELECTRIC MFG. CO.

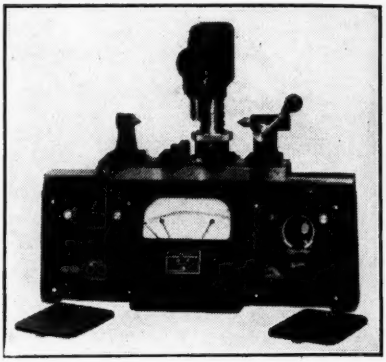
4519 HAMILTON AVE., N.E. CLEVELAND 14, OHIO

Chicago Office — 1525 E. 53rd St.

centage of the smoothness of the standard use for setting the comparator. If desired, this value may be converted to units currently used to express surface finish smoothness.

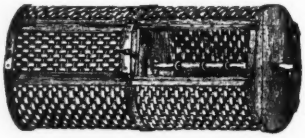
The work-holding carriage has a 7-inch travel and a 6-inch cylindrical capacity. Flat parts are placed on its table, and cylinders are held between centers or placed on vees with Norbide inserts.

To use the Comtor Surface Comparator, a standard of known surface finish value is placed on the work-holding table, the finish meter set and its tolerance markers adjusted, with the instrument then ready for immediate shop use.



Comtor Quick Scanning Surface Comparator

Inexpensive, light in weight.
Easy to install and operate.



King White-Oak Plating Barrel

becomes a sub-anode, thereby producing a cleaner, brighter plate. Less plating time is required to put on the desired thickness of plate.

Send for catalogue and specification sheets.

JOHN KING 48 SPRINGFIELD ST. DAYTON 3, OHIO

Norton Alundum Abrasive for Tumbling

Alundum Abrasive for the deburring or polishing of metals by the tumbling method is announced by the Norton Co., Worcester 6, Mass. Available both tumbled and untumbled, it can be used in either tilt type or rotary type barrels. According to the manufacturer, the Alundum Abrasive does not wear away rapidly and produces uniformly good work, load after load.

Alundum Abrasive for tumbling is available in four sizes; namely, ¼ to ⅓ inch, ½ to ¾ inch, ⅜ to 1 inch, and 1 to 1½ inches.

Let PERMAG Compounds help master your Cleaning Problems

When a baffling metal cleaning job comes along try PERMAG. Depend on its efficiency—speed—economy. PERMAG is solving new problems in these reconversion days.

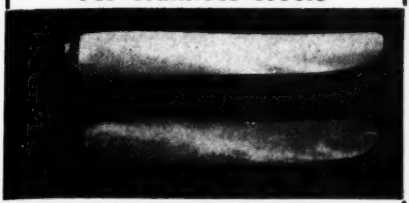
Our Technical Service is at your command. Write us.

MAGNUSON PRODUCTS CORPORATION

Main Office: 50 Court St., Brooklyn 2, N. Y.

In Canada: Canadian PERMAG Products, Ltd., Montreal • Toronto

HIGH LUSTRE
For Stainless Steels



"You see the Difference"

4A

POLISHING COMPOUNDS

Produce that extra value in a beautiful finish — are known for economical cutting, cut and color and mirror finishing on all kinds of steel including stainless and carbon steels and hard-to-buff alloys.

SAMPLES ON REQUEST

HARRISON & COMPANY
HAVERHILL, MASSACHUSETTS
Polishing Compounds
Coloring Rouges—4A Cement and Thinner

Save Fingers
with Steel-Grip Finger Guards

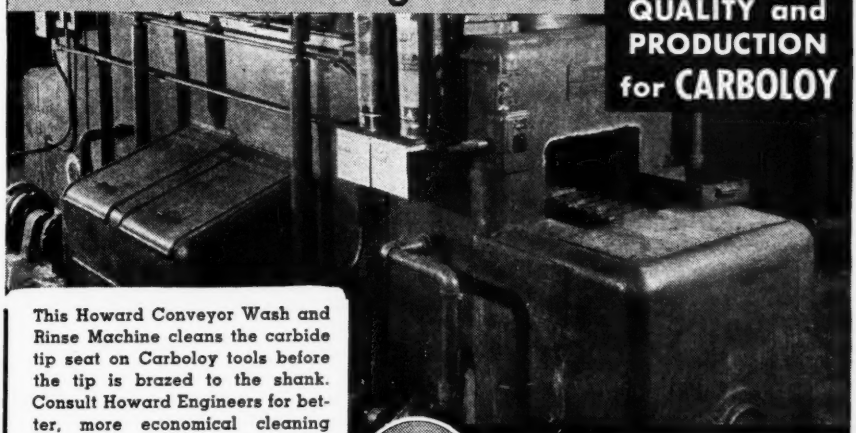
Hundreds of factories save time and injuries and speed production by protecting workers with Steel-Grip Finger Guards. Used for handling rough or sharp articles, for buffing, grinding, sanding, polishing, punch press work and hundreds of other jobs. Protect fingers or thumb, front or back, from cuts, abrasions or blisters. Made of durable leather with elastic web back for snug, cool, comfortable fit. Easy on and off. One size fits all, men or women. Send 10c each for samples or trial order box of 50 at $4.25 less 10%. *Catalog of Steel-Grip Safety Apparel free on request.*

Famous Industrial Safeguards Since 1910

INDUSTRIAL GLOVES CO.
716 GARFIELD BLVD. DANVILLE, ILL.
Canada: Safety Supply Co., Toronto

HOWARD *Cleaning Machine*

***IMPROVES* QUALITY and PRODUCTION for CARBOLOY**



This Howard Conveyor Wash and Rinse Machine cleans the carbide tip seat on Carboloy tools before the tip is brazed to the shank. Consult Howard Engineers for better, more economical cleaning and finishing equipment.

Machinery for Pickling • Tumbling • Deburring • Washing • Quenching • Drying • Burnishing.

WRITE FOR CATALOG

HOWARD

HOWARD ENGINEERING & MANUFACTURING CO.
2237 BUCK STREET
CINCINNATI 14, OHIO

Magnus Aja-Dip, Jr. Cleaning Machine

Magnus Aja-Dip, Jr. Cleaning Machine

The Equipment Division of the Magnus Chemical Co., Inc., 208 South Ave., Garwood, N. J., announces a small machine for the cleaning of metal parts in production. Designated as the Magnus Aja-Dip, Jr., the machine is said to be especially suited for metal-working shops whose volume of parts to be cleaned does not warrant the installation of fully automatic cleaning equipment.

The unit can be used for the complete removal of cutting oil and chips, buffing compounds, smut, abrasives, or any other deposit resulting from stamping, drawing, cutting, grinding, burnishing, or other operations. Parts are handled in batches of 30 to 75 depending upon the model of the machine. One full batch of parts can be handled every two or three minutes.

During the operation of the Magnus Aja-Dip, Jr. Cleaning Machine, the parts to be cleaned are vigorously agitated up and down, 72 times a minute, in the cleaning solution. This agitation, plus the action of the cleaning solution, provides for the "shearing" of dirty deposits from all surfaces of the parts, it is claimed. The machine can be used with any type of cleaning compound, alkaline, petroleum spirits, emulsifying agents, and chlorinated solvents, and may be operated with hot or cold solutions. If heated solutions are to be used, the heating may be effected by either electricity or gas.

The Magnus Aja-Dip, Jr. Cleaning Machine is available in two sizes designated as the Nos. 0 and 00. Either of the two models can be supplied with built-in rinse compartments which may also have the agitation feature, if desired.

Don't Forget!

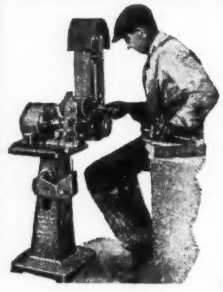
McKEON'S

"Liquid Sulphur"

"The Oxidizing Agent of Today"

SULPHUR PRODUCTS CO.

GREENSBURG 6, PA.



"PRODUCTION" TYPE S

Centerless POLISHER • BUFFER SURFACER

Polisher, buffer, surfacer and vertical or horizontal belt grinder, with centerless feed are all combined in the "PRODUCTION" TYPE S machine.
Ideal for cylindrical polishing or straight line finishing on flat work. Can be used for anything that can be ground or polished—metals, rubber, fibre, wood, etc.

Write for Illustrated Folder

PRODUCTION MACHINE CO. • GREENFIELD, MASS.

Miccrolac High Luster Protective Coating

Bearing the designation Miccrolac, a coating lacquer with a high luster mirror finish that is said to protect and beautify the finest of metal surfaces is now being marketed by the Michigan Chrome and Chemical Co., 6340 E. Jefferson Ave., Detroit 7, Mich. The material is claimed to be ideal for use on silver plated ornaments, trophies, lighting fixtures, polished brass and brass plated products, automobile hardware, exposed metal surfaces of scientific instruments, and so on.

Applicable by spray, dip, or brush methods, Miccrolac, according to the manufacturer, possesses the following outstanding characteristics: dries to a very high luster; provides maximum adhesion; is extremely flexible, thus resisting bending and vibration; is usually abrasion resistant and does not chip or crack; is very fast drying; offers excellent resistance to sulphur dioxide, sunlight, moisture, oil, grease, gasoline, and all commonly known chemical fumes, as well as salt spray, acid, and alkalies; is water white, thus eliminating color tinge; and does not blush even in humid weather.

"Alumadizing" Process

"Alumadizing," a process for anodizing aluminum with the use of a.c. or d.c. power, is now being marketed by the All-Brite Chemical Co., P. O. Box 1542, Waterbury, Conn. According to the manufacturer, the process provides for the production of an oxide film which has unusual corrosion resistance and will withstand normal use indefinitely. This oxide film is said to approach the diamond in hardness and may be dyed.

To employ the Alumadizing Process, the aluminum is first cleaned in the normal manner and then immersed in a solution of Alumadizing salts dissolved in water—2½ lb. per gallon. The temperature of operation is from 60 to 95 deg. F. and is not critical in this range, it is claimed. Current densities range from 15 to 30 amperes per square foot at 20 volts. The thickness of oxide film produced in ½ hour is 0.0006 inch. Color is obtained by immersion of the work in a suitable solution of dye or inorganic pigments.

SPARKLER
HORIZONTAL PLATE
Plating Solution Filters
give you ABSOLUTE CLARITY

As a Bonus you get:
• LONGER CYCLES • HIGHER FLOW RATES

For accurate, automatic addition of filter aid in continuous filtration, install Sparker's auxiliary slurry tank, agitator and proportioning Pump.

SPARKLER MANUFACTURING COMPANY
254 LAKE STREET MUNDELEIN, ILLINOIS

WRITE FOR FULL DETAILS

SPARKLER HORIZONTAL PLATE FILTERS

Opportunity Section

WANTED

POLISHING AND PLATING FOREMAN, experienced in brass and jewelry type items. Good opportunity with a nationally known concern located in the New York metropolitan area. Write full details for interview. Data furnished will be treated as confidential. Write Box 125, care of Products Finishing, 431 Main St., Cincinnati 2, Ohio.

Industrial Finishes Salesman Wanted

Highly reputable Chicago paint and varnish manufacturer desires a young energetic man for technical sales work in the Chicago and Middle West area. Must have successful background of product finish sales in this territory. This is really a splendid opportunity for a man who knows the product finish business and who wants unlimited present and future possibilities. Write us full details regarding yourself and your experience. Our salesmen know of this advertisement. Write Box 129, in care of Products Finishing, 431 Main St., Cincinnati 2, Ohio.

Production Engineer Plating and Polishing

Familiar with automatic polishing and buffing of steel and die cast parts similar in size to automobile bumpers and radiator grilles. Definite past experience in various phases of copper, nickel, and chrome polishing and buffing is essential. Position is with automotive company in Michigan having large installaton of automatic plating and polishing equipment. Write Box 123, Products Finishing, 431 Main St., Cincinnati 2, Ohio.

Old established manufacturing company wants Industrial salesman for the New England and greater New York territories. Must have chemical engineering or electrical training. Write us giving age and experience. Salary and bonus. Write Box 128, Products Finishing, 431 Main Street, Cincinnati 2, Ohio.

TWO A-1 BUFF AND POLISHING WHEEL SALES OPPORTUNITIES OPEN

Two important territories available to experienced and productive sales representatives in the metal finishing field: 1. In New York City territory or in New England States. 2. In Ohio and part of Indiana with headquarters in Cleveland. State qualifications, background and references. Please address all inquiries to Sydney S. Lovitt Company, 540 N. Michigan Avenue, Chicago 11, Illinois.

Well-known chemical manufacturer of rust preventive and oil specialty products has opening for experienced sales executive who has had several years in the metal cleaning field. Very good earning opportunity for man capable of taking complete charge of cleaning material sales department.

NOX-RUST CHEMICAL CORPORATION

2429 S. Halsted St., Chicago 8, Illinois

SALES MANAGER— WOOD FINISHING

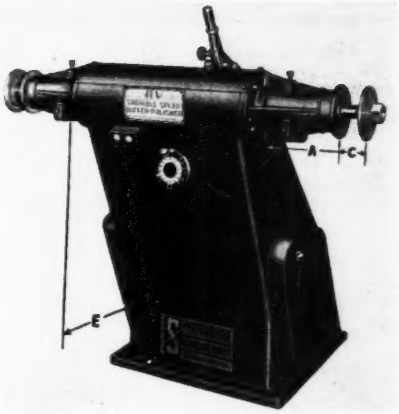
We have an unusual opportunity for a person capable of assuming responsibility of this division, creating an outstanding sales organization and directing an aggressive campaign to make the WOOD FINISHING division an important segment of our business. A special technical group have worked for the past year developing a complete line of products which will be ready by January, 1946. We are interested in receiving replies from qualified WOOD FINISHING salesmen or managers. A managerial background, while preferable, is not requisite.

JONES-DABNEY CO., Louisville, Ky.

"Standard" Type RV Variable Speed Buffing and Polishing Machine

The accompanying illustration shows the "Standard" Type RV Variable Speed Buffing and Polishing Machine now being marketed by The Standard Electrical Tool Co., 2518 River Rd., Cincinnati 4, Ohio. Available in 5 and 7½ h.p. sizes, the machine is so arranged that any spindle speed between 1,500 and 3,000 r.p.m. can be instantly obtained through the use of the "Speedial" control, thus allowing for the finishing of a wide variety of workpieces. In addition, as wheels reduce in diameter, the Speedial control permits the spindle speed to be increased for maintaining the desired peripheral speed of the wheels.

The design of the Standard Type RV Buffing and Polishing Machine also includes a coincidental switch-brake for stopping the spindle and shutting off the current, a separate push-button station being used for starting the motor; conveniently located shaft lock for use in changing wheels; and four ball bearings located in liberal size oil reservoirs with sight feed oil gage on each bearing housing. The construction of the machine is such that the spindle overhangs the front of the base. Referring to the illustration, the "E" dimension indicated is 13 inches.



"Standard" Type RV Variable Speed Buffing and Polishing Machine

Electro Plating SUPPLIES and EQUIPMENT

Complete Coverage for the Plater

The MUNNING *LINE for Quality*

- **Equipment of every character**
- **Power Supply in both Green Rectifiers and Chandeysson Motor Generator Sets**
- **Polishing and Tumbling Equipment of every type**
- **Anodes . . . Buffs . . . Chemicals**

An experienced engineering service is maintained at our plant for advising on the best methods of finishing metal products.
You are invited to consult with our technicians about your problem.

MUNNING & MUNNING, Inc.

Engineers -- Designers -- Manufacturers

Main Office and Plant: **202-208 EMMETT ST., NEWARK 5, N. J.**
NEW YORK • PHILADELPHIA • WOONSOCKET, R. I.

The Finishing Touch — **By J. A. Patterson**

"Think you could do my friend here any good — he accidentally fell into a barrel of grease!"

McAleer Finishing Materials. A complete line of quality controlled finishing materials for polishing, buffing, and deburring are described in a 24-page illustrated catalog issued by the Indus-

trial Finishing Division, Dept. P-1, McAleer Manufacturing Co., Rochester, Mich. In addition to prewar finishng materials, the catalog also provides data on new finishing compositions developed for postwar production finishing needs.

Available free to all qualified industrial finishing material users, the catalog tells when and where to use what compositions, summarizes and interprets applications, and offers many helpful suggestions for the present-day finishing of non-metallic materials as well as plastics.

"Modern pH and Chlorine Control." W. A. Taylor & Co., 7300 York Rd., Baltimore 4, Md., announces a completely revised (7th) edition of the Taylor combination handbook and catalog which contains both simple and technical explanations of the meaning of pH control; specific discussions of the application of pH, chlorine, and phosphate control to 35 industries; the precautions to be observed in making determinations; and descriptions of all Taylor outfits, including eight new sets. Copy free upon request.

Quality Chemicals for over 50 years

PHELPS DODGE REFINING CORPORATION
NICHOLS
TRIANGLE BRAND
REG. U. S. PAT. OFF.
CHEMICALS
40 WALL ST. NEW YORK

COPPER SULPHATE
NICKEL SULPHATE
COPPER OXIDE

Why Hunt Around for Parts Protection?

For storage or transit. Save time—save money—by using real efficient, **specially designed** protection—

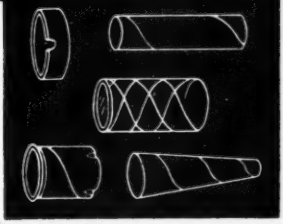
PRECISION *Dust Caps and Thread Protectors*

External and internal protection. Regular and irregular shapes. Strong fibre, spirally wound. Snug fit. No slipoffs.

SEND FOR SAMPLES

PRECISION PAPER TUBE CO.

2053 W. CHARLESTON ST. CHICAGO 47, ILL.



CATALOGS

FOR YOUR LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Cleaning and Finishing
A data book which contains important information on the design and applications of Howard metal cleaning and finishing machinery has been prepared by the Howard Engineering and Manufacturing Co., 2236 Buck St., Cincinnati 14, Ohio.

2. Grinding and Polishing Machine
An illustrated folder on a combination grinding and polishing machine for disc grinding, polishing, burring, and surfacing has been published by the Production Machine Co., Greenfield, Massachusetts.

3. Infra-Red Ovens
Prefabricated infra-red ovens are the subject of Bulletin No. 500 now being distributed by the Trumbull Electric Manufacturing Co., Plainville, Connecticut.

4. Temperature Controls
Special self-operated temperature controls for degreasing and cleaning machines are the subject of Bulletin 650 available from the Sarco Co., Inc., 475 Fifth Ave., New York 17, New York.

5. Burring and Burring Compounds
A four-page illustrated folder containing helpful information for solving burring problems has been prepared by the Roberts Rouge Co., Stratford, Conn. Included with the folder is a leaflet providing suggestions regarding the use of Roberts Burring Compound.

6. Metal Degreasing
The Solvents Division of the Electrochemicals Dept. of E. I. du Pont de Nemours & Co., Inc., Wilmington 98. Del., has prepared a 10-page booklet of standard practices for degreasing metals or other non-porous materials with chlorinated solvents.

7. Metal Preparation
Literature on a line of "Prep" products for cleaning and preparing metal for paint is now being offered by the Neilson Chemical Co., 6564 Benson St., Detroit 7, Michigan.

8. Plating Barrels
Illustrative and descriptive data on white oak machine woven plating barrels are contained in a 12-page catalog released by John King, 38 Springfield St., Dayton 3, Ohio.

9. Protective Coating Materials
Information on a complete line of protective coating materials for the insulation of plating racks, masking parts prior to selective plating and so on, is available from the Michigan Chrome and Chemical Co., 6342 E. Jefferson, Detroit 7, Michigan.

10. Corrosion-Resistant Masonry
The U. S. Stoneware Co., Akron, Ohio, has prepared a 52-page bulletin containing complete information on acidproof masonry construction for tanks, towers, sumps, floors, and so on.